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NTE7136
Integrated Circuit
Vertical Deflection Power Amplifier for Monitors

Description:

The NTE7136 is a vertical power amplifier for differential input signals in a 9–Lead SIP type package suitable for color monitor/TV systems with deflection frequencies up to 140Hz.

Features:

- Vertical Pre–Amplifier with Differential Inputs
- Powerless Vertical Shift
- Flyback Voltage Generation Suitable for Two Operating Modes (Doubling the Supply Voltage or External Supply for the Short Flyback Time, this Achieves a Minimum of Power Dissipation)
- Vertical Output Stage with Thermal and SOAR Protection
- High Deflection Frequency up to 140Hz
- High Linear Sawtooth Signal Amplification
- Possibility of Guarding the Deflection
- Voltage Stabilizer

Absolute Maximum Ratings: (Voltages referenced to substrate (Pin6) unbless otherwise specified)

Supply Voltage (Pin1), V_{P1} 40V
Supply Voltage (Pin4), V_{P2} 60V
Supply Voltage (Pin8), V_{P3} 60V
Voltage on Pin2, Pin3, and Pin9, V_2, V_3, V_9 . . . . . V_{P1}
Voltage on Pin5 and Pin7, V_5, V_7 . . . . . 60V
Current on Pin4, I_4 . . . . . 1A
Output Current on Pin5 (Peak Value, Note 1), $I_{5\,(M)}$ . . . . . ±1.5A
Flyback Current on Pin7 (Peak Value), $I_{7\,(M)}$ . . . . . ±1.5A
Current on Pin9, I_9 . . . . . –8A
Junction Temperature (Note 1), T_{VJ} . . . . . +168°C
Operating Ambient Temperatrure Range, T_A . . . . . –20° to +75°C
Storage Temperature Range, T_{stg} . . . . . –25° to +150°C
Thermal Resistance, Junction–to–Mounting Base, R_{thJMB} 5K/W
Electrostatic Handling for all Pins (Note 2), V_{es} . . . . . ±300V

Note 1. Internally limited by thermal protection; switching temperature point at 160 ±8°C
Note 2. Equivalent to discharging a 200pF capacitor throuhg a 0Ω series resistor.

Electrical Characteristics: ($V_{P1} = V_{P2} = 25V$, $V_N = V_6 = 0V$, $T_A = +25°C$, voltages referenced to substrate (Pin6) unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Voltage 1 (Pin1)	V_{P1}		9	25	30	V
Supply Voltage 2 (Pin4)	V_{P2}		9	25	60	V
Supply Voltage 3 (Pin8)	V_{P3}		9	–	60	V
Supply Current (Pin1)	I_{P1}		–	–	10	mA
Quiescent Supply Current (Pin4)	I_{P2}	Without Input Signal	–	9	–	mA
Pre–Amplifier						
Input Voltage (Pin2 and Pin3)	V_2, V_3		1.6	–	V_{P1}–0.5	V
Input Quiescent Current	I_2, I_3	Without Input Signal	–	100	–	nA
Flyback Generator						
Output Voltage	V_7	Upper Value, $I_7 = –1A$	–	V_{P3}–2.2	–	V
Flyback Output Current (Maximum Value, Pin7)	$I_{7\ (M)}$		–	–	±1.3	A
Threshold Voltage to Switch Flyback	$V_{1–5}$	ON/OFF Threshold	–	1.4	–	V
Flyback Pulse Time	$t_{p\ FLB}$		–	250	–	µs
Vertical Output						
Output Voltage	V_5	Upper Value, $I_5 = –1A$	V_{P2}–2.3	V_{P2}–2	–	V
		Lower Value, $I_5 = 1A$	–	1.5	1.7	V
		Upper Value, $I_5 = –1.4A$	–	V_{P2}–2.3	–	V
		Lower Value, $I_5 = 1.4A$	–	1.7	–	V
Vertical Output Current (Peak–to–Peak Value, Pin5)	$I_{5\ (P–P)}$		–	–	2.8	A
Non–Linearity of Output Signal	LIN		–	–	1	%
Pulse Circuit Output						
Output Voltage	V_9	$R_{PCO} = 10k\Omega$	0.4	–	V_{P1}–0.4	V
Output Voltage for Thermal Protection Active	V_9		V_{P1}–0.4	–	–	V
Voltage to Insert Flyback Pulse on Pin9	$V_{1–5}$	Normal Condition	–	–	1.4	V
Pulse Width	t_{p9}	Deflection Open–Circuit	–	50	–	%
		Normal Condition	$t_{p\ FLB}$	–	–	µs

Functional Description:

Differential Input Amplifier

The differential sawtooth input signal (coming from a ramp output of the NTE7132 for example) is fed to the input pins 2 and 3. The non–inverted signal is attached to Pin3. The vertical feedback signal is superimposed on the inverted input signal on Pin2.

Vertical shift is applied at the inputs in a power–less way.

Flyback Generator

Signals for the flyback generator and the pulse circuit are generated in the flyback driver stage. The flyback output consists of a Darlington transistor and a flyback diode. The flyback generator can operate in two modes:

1. An external supply voltage is applied for the short flyback time, thus power dissipation is minimum.
2. The flyback voltage is generated by doubling the supply voltage. The 100µF capacitor C2 between Pin4 and Pin7 is charged up to V_{P1} during scan, using the external diode and the resistor R2. The cathode of the capacitor C2 is connected to the positive rail during flyback. Thus, the flyback voltage is twice the supply voltage.

Functional Description (Cont'd):

Vertical Output

The vertical output stage is a quasi–complementary class–B amplifier with a high linearity. The output contains SOAR (short–circuit protection) and thermal protection. The output current on Pin5 is reduced for a short time (to let the temperature decrease to $T_J < +150°C$), when the junction temperature (T_J) exceeds +160°C.

Deflection GUARD

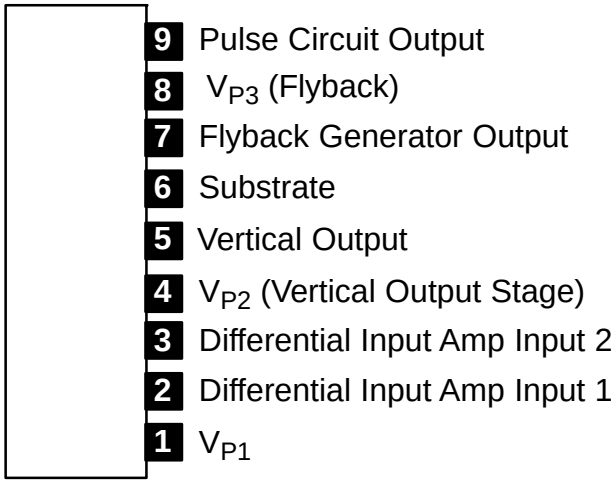
Pin9 will go HIGH if the junction temperature goes too high. A pulse signal with 50% duty cycle is output on Pin9, if the deflection coil is open–circuit. A flyback pulse signal is output at normal conditions.

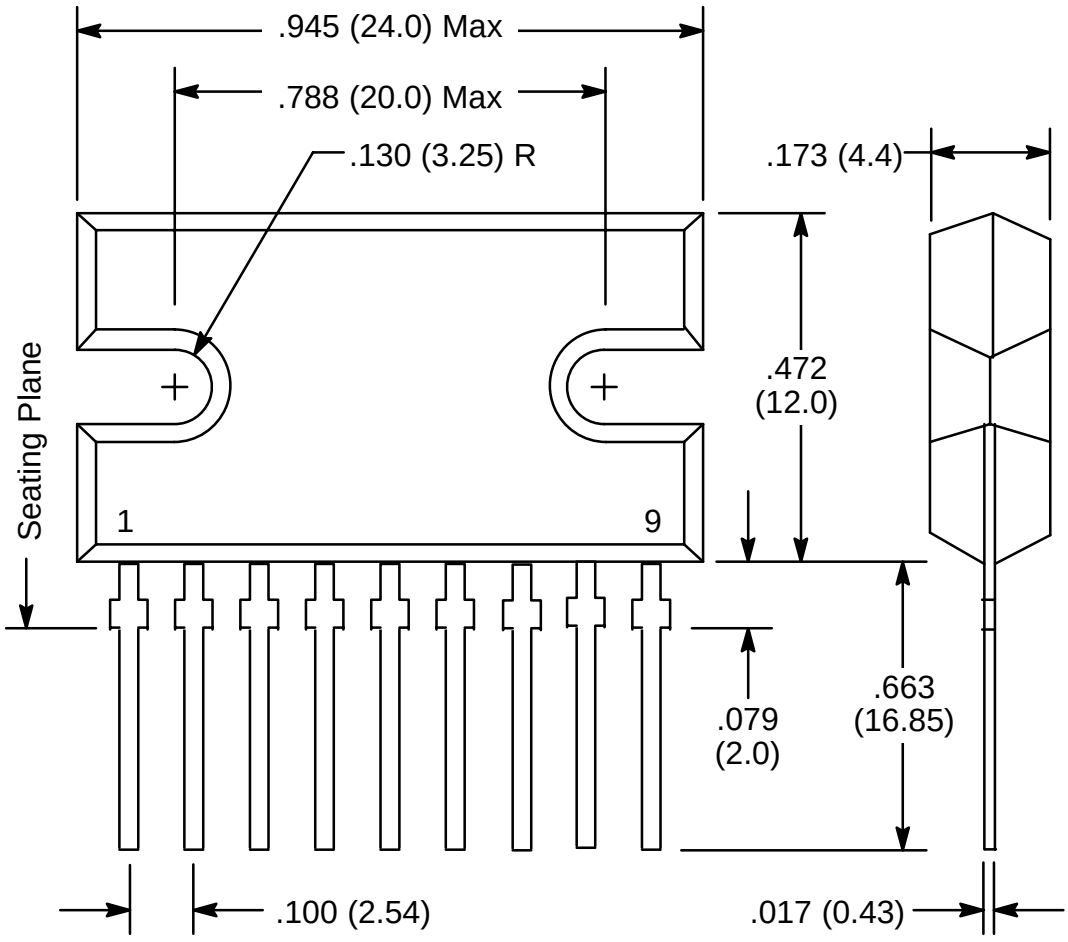
Further watching can be achieved by means of an external GUARD circuit. The 22µF capacitor is charged during flyback time ($V_5 > V_8$) at normal conditions. In case of failures, the capacitor is discharged and the GUARD output goes HIGH.

GUARD output level:

- LOW for normal conditions
- HIGH for deflection coil short–circuit respectively open–circuit
- HIGH when there are neither input or output signals

Pin Connection Diagram
(Front View)




.945 (24.0) Max
.788 (20.0) Max
.130 (3.25) R
.173 (4.4)
.472
(12.0)
Seating Plane
1
9
.079
(2.0)
.663
(16.85)
.100 (2.54)
.017 (0.43)