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NTE871 Integrated Circuit Wideband High Speed Operational Amp

Description:

The NTE871 is a large-signal wideband, high speed operational amplifier which has a unity gain crossover frequency (f_T) of approximately 38MHz and an open-loop, 3dB corner frequency of approximately 110kHz. It can operate at a total supply voltage of from 14 to 36 volts (± 7 to ± 18 volts when using split supplies) and can provide at least $18V_{P-P}$ and $30mA_{P-P}$ at the output when operating from ± 15 volt supplies. The NTE871 can be compensated with a single external capacitor and has DC offset adjust terminals for those applications requiring offset null.

The NTE871 circuit contains both bipolar and PMOS transistors on a single monolithic chip and is supplied in a 8-Lead TO5 package.

Features:

- High Open-Loop Gain at Video Frequencies: 42dB Typ. at 1MHz
- High Unity-Gain Crossover Frequency: $f_T = 38MHz$ Typ.
- Wide Power Bandwidth;
 $V_O = 18V_{P-P}$: 1.2MHz Typ.
- High Slew Rate;
 20dB Amplifier: $70V/\mu s$ Typ.
 Unity-Gain Amplifier: $25V/\mu s$ Typ.
- Fast Setting Time: $0.6\mu s$ Typ.
- High Output Current: $\pm 15mA$ Min.
- Single Capacitor Compensation
- Offset Null Terminals

Absolute Maximum Ratings:

Supply Voltage (Between V_+ and V_- terminals)	36V
Differential Input Voltage	$\pm 12V$
Input Voltage to GND (Note 1)	$\pm 15V$
Offset Terminal to V_- Terminal Voltage	$\pm 0.5V$
Output Current (Note 2)	50mA
Device Dissipation (Up to $T_A = +55^\circ C$), P_D	630mW
Derate Above $T_A = +55^\circ C$	6.67mW/ $^\circ C$
Operating Temperature Range, T_{opr}	-55° to $+125^\circ C$
Storage Temperature range, T_{stg}	-65° to $+150^\circ C$
Lead Temperature (During Soldering), T_L	
At distance $1/16" \pm 1/32"$ ($1.59 \pm 0.79mm$) from case for 10s max	$+265^\circ C$

Note 1. If the supply voltage is less than ± 15 volts, the maximum input voltage to GND is equal to the supply voltage.

Note 2. The NTE871 does not contain circuitry to protect against short circuits in the output.

Electrical Characteristics: ($T_A = +25^\circ\text{C}$, $V_{CC} = \pm 15\text{V}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Input Offset Voltage	V_{IO}	$V_O = 0 \pm 0.1\text{V}$	–	± 1	± 5	mV
Input Bias Current	I_{IB}	$V_O = 0 \pm 0.1\text{V}$	–	0.7	2.0	μA
Input Offset Current	I_{IO}	$V_O = 0 \pm 0.1\text{V}$	–	± 0.05	± 0.4	μA
Low-Frequency Open-Loop Voltage Gain	A_{OL}	$V_O = \pm 1\text{V Peak}$, $F = 1\text{kHz}$, Note 3	56	61	–	dB
Common-Mode Input Voltage Range	V_{ICR}	$\text{CMRR} \geq 76\text{dB}$	± 12	+14 –13	–	V
Common-Mode Rejection Ratio	CMRR	V_I Common Mode = $\pm 12\text{V}$	76	90	–	dB
Maximum Output Voltage: Positive	V_{OM+}	Differential Input Voltage = $0 \pm 0.1\text{V}$ $R_L = 2\text{k}\Omega$	+9	+11	–	V
Negative	V_{OM-}		–9	–11	–	
Maximum Output Current: Positive	V_{OM+}	Differential Input Voltage = $0 \pm 0.1\text{V}$ $R_L = 250\text{k}\Omega$	+15	+30	–	mA
Negative	V_{OM-}		–15	–30	–	
Supply Current	I_+	$V_O = 0 \pm 0.1\text{V}$, $R_L \geq 10\text{k}\Omega$	–	8.5	10.5	mA
Power Supply Rejection Ratio	PSRR	$\Delta V_+ = \pm 1\text{V}$, $\Delta V_- = \pm 1\text{V}$	60	70	–	dB
Dynamic						
Unity-Gain Crossover Frequency	f_T	$C_C = 0$, $V_O = 0.3V_{P-P}$	–	38	–	MHz
1MHz Open-Loop Voltage Gain	A_{OL}	$f = 1\text{MHz}$, $C_C = 0$, $V_O = 10V_{P-P}$	36	42	–	dB
Slew Rate 20dB Amplifier	SR	$A_V = 10$, $C_C = 0$, $V_I = 1\text{V}$ (Pulse)	50	70	–	$\text{V}/\mu\text{s}$
Follower Mode		$A_V = 1$, $C_C = 10\text{pF}$, $V_I = 10\text{V}$ (Pulse)	–	25	–	
Power Bandwidth 20dB Amplifier	PBW (Note 4)	$A_V = 10$, $C_C = 0$, $V_O = 10V_{P-P}$	0.8	1.2	–	MHz
Follower Mode		$A_V = 1$, $C_C = 10\text{pF}$, $V_O = 10V_{P-P}$	–	0.4	–	
Open-Loop Differential Impedance	Z_I	$F = 1\text{MHz}$	–	30	–	$\text{k}\Omega$
Open-Loop Output Impedance	Z_O	$F = 1\text{MHz}$	–	110	–	Ω
Wideband Noise Voltage Referred to Input	$e_N(\text{Total})$	$\text{BW} = 1\text{MHz}$, $R_S = 1\text{k}\Omega$	–	8	–	μV_{RMS}
Setting Time (To Within $\pm 50\text{mV}$ of 9V Output Swing)	t_s	$R_L = 2\text{k}\Omega$, $C_L = 20\text{pF}$	–	0.6	–	μs

Note 3. Low-frequency dynamic characteristics.

Note 4. Power Bandwidth =
$$\frac{\text{Slew Rate}}{\pi V_O (\text{P-P})}$$

Pin Connection Diagram

(Top View)

Offset Null

