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NTE869
Integrated Circuit
Dual, High Speed, Programmable
Current Mode (Norton) Amp

Description:

The NTE869 consists of two current differencing (Norton) input amplifiers. Emphasis has been placed on obtaining high frequency performance and providing user programmable amplifier operating characteristics. Each amplifier is broadbanded to provide a high gain bandwidth product, fast slew rate and stable operation for an Inverting closed loop gain of 10 or greater. Pins for additional external frequency compensation are provided. The amplifiers are designed to operate from a single supply and can accommodate input common–mode voltages greater than the supply.

Applications:

- General Purpose Video Amplifiers
- High Frequency, High Q Active Filters
- Photo–Diode Amplifiers
- Wide Frequency Range Waveform Generation Circuits
- AC Applications Work to much Higher Frequencies

Features:

- User programmable gain bandwidth product, slew rate, input bias current, output stage biasing current and total device power dissipation.
- High gain bandwidth product (I_{SET} = 0.5mA)
  - 400MH_Z for A_V = 10 to 100
  - 30MH_Z for A_V = 1
- Current differencing inputs allow high common–mode input voltages
- Operates from a single 5V to 22V supply
- Large inverting amplifier output swing, 2mV to V_{CC} –2V
- Low spot noise, 6nV/√Hz, for f > 1kH_Z

Absolute Maximum Ratings:

Supply Voltage	22V
Supply Voltage	±11V
Power Dissipation, P_D	750mW
Input Currents, $I_{IN}(+)$ or $I_{IN}(–)$	10mA
Set Currents, $I_{SET(IN)}$ or $I_{SET(OUT)}$	2mA
Maximum Junction Temperature, T_J	+125°C
Operating Temperature Range, T_{opr}	0° to 70°C
Thermal Resistance, Junction–to–Ambient, R_{thJA}	160°C/W
Lead Temperature (During Soldering, 10sec), T_L	+300°C

Electrical Characteristics: ($I_{SET(IN)} = I_{SET(OUT)}$ = 0.5mA, V_{supply} = 12V, T_A = +25°C unless otherwise noted.)

Parameter	Test Conditions	Min	Typ	Max	Unit
Open Loop Voltage Gain	V_{supply} = 12V, R_L = 1k, f = 100Hz T_A = 125°C	62 –	72 68	– –	dB
Bandwidth Unity Gain	R_{IN} = 1kΩ, C_{comp} = 10pF	15	30	–	MH_Z
Gain Bandwidth Product Gain of 10 to 100	R_{IN} 50Ω to 200Ω	200	400	–	MH_Z
Slew Rate Unity Gain Gain of 10 to 100	 R_{IN} = 1kΩ, C_{comp} = 10pF R_{IN} < 200Ω	 – –	 30 60	 – –	V/μs
Amplifier to Amplifier Coupling	f = $100H_Z$ to $100kH_Z$, R_L = 1k	–	–80	–	dB
Mirror Gain (Note 1)	@ 2mA I_{IN}(+), I_{SET} = 5μA, T_A = 25°C @ 0.2mA I_{IN}(+), I_{SET}=5μA Over Temp @ 20μA $I_{IN(+)}$, I_{SET} = 5μA Over Temp	0.9 0.9 0.9	1.0 1.0 1.0	1.1 1.1 1.1	μA/μA
Mirror Gain (Note 1)	@ 20μA to 0.2mA I_{IN}(+) Over Temp, I_{SET} = 5μA	–	3	5	%
Input Bias Current	Inverting Input, T_A = 25°C Over Temp	–	8	15	μA
Input Resistance (βre)	Inverting Input	–	2.5	–	kΩ
Output Resistance	I_{OUT} = 15mA rms, f = 1MHz	–	3.5	–	Ω
Output Voltage Swing V_{OUT} High V_{OUT} Low	R_L = 600Ω I_{IN}(–) & I_{IN}(+) Grounded I_{IN}(–) = 100μA, I_{IN}(+) = 0	 9.5 –	 10.3 2.0	 – 50	 V mV
Output Currents Source Sink (Linear Region) Sink (Overdriven)	 I_{IN}(–) & I_{IN}(+) Grounded, R_L = 100Ω V_{comp} =0.5V = V_{OUT} = 1V, I_{IN}(+) = 0 I_{IN}(–) = 100μA, I_{IN}(+) = 0, V_{OUT} Force = 1V	 16 – 1.5	 40 4.7 3.0	 – – –	 mA
Supply Current	Non–Inverting Input Grounded, R_L=∞	–	18.5	22	mA
Power Supply Rejection	f = $120H_Z$, I_{IN}(+) Grounded	40	50	–	dB

Note 1. Mirror gain is the current gain of the current mirror which is used as the non–inverting input.

$$\left(A_I = \frac{I_{IN}\,(-)}{I_{IN}\,(+)}\right) \Delta\text{Mirror}$$

Pin Connection Diagram