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NTE825
Integrated Circuit
Battery Operated Audio Amp

Description:

The NTE825 amplifier is an integrated circuit in a 14–Lead DIP type package optimized for 6V, 7.5V, and 9V operation into low impedance loads. The gain is internally set at 20 to keep the external part count low, but the addition of an external resistor and capacitor between Pin2 and Pin6 will increase the gain to any value up to 200. The inputs are ground referenced while the output is automatically biased to one half the supply voltage.

Features:

- Battery Operation
- 1W Output Power
- Excellant Supply Rejection
- Low Distortion

Applications:

- AM–FM Radio Amplifiers
- Portable Tape Player Amplifiers
- TV Sound Systems

Absolute Maximum Ratings: (Note 1)

Supply Voltage, V_S 10V
Power Dissipation, P_D 8.3W
Input Voltage, V_I . . . . . ±0.4V
Storage Temperature Range, T_{stg} . . . . . –65° to +150°C
Operating Temperature Range, T_{opr} . . . . . 0° to +70°C
Junction Temperature, T_J . . . . . +150°C
Lead Temperature (During Soldering, 10 seconds), T_L . . . . . +300°C

Note 1. Pins 3, 4, 5, 10, 11, 12 at T_C = +25°C. Derate at 15°C/W above T_C = +25°C.

Electrical Characteristics: (T_A = 25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Operating Supply Voltage	V_S		4	–	9	V
Quiescent Current	I_Q	V_S = 6V, R_L = 4Ω, THD = 10%, Note 2	–	10	20	mA
Output Power	P_{OUT}	V_S = 6V, R_L = 4Ω, THD = 10%, Note 2	0.8	1.0	–	W
Voltage Gain	A_V	V_S = 6V, f = 1kHz 10μF from Pin2 to Pin6	23	26	30	dB
Bandwidth	BW	V_S = 6V, Pin2 and Pin6 Open	–	46	–	kHz
Total Harmonic Distortion	THD	V_S = 6V, R_L = 4Ω, P_{OUT} = 500mW, f = 1kHz, Pin2 and Pin6 Open	–	0.2	1	%
Power Supply Rejection Ratio	PSRR	V_S = 6V, f = 1kHz, C_{BYPASS} = 10μF, Pin2 and Pin6 Open, Referred to Output, Note 3	–	50	–	dB
Input Resistance	R_{IN}		10	50	–	kΩ
Input Bias Current	I_{BIAS}	V_S = 6V, Pins 7 and 8 Open	–	250	–	mA

Note 2. If oscillation exists under some load conditions, add a 2.7Ω and 0.05μF series network from Pin13 to GND.

Note 3. If load and bypass capacitor are returned to V_S rather than GND, PSRR is typically 30dB.

Application Hints:

Gain Control

To make the NTE825 a more versatile amplifier, two pins (Pin2 and Pin6) are provided for gain control. With Pin2 and Pin6 open, the gain is 20 (26dB). If a capacitor is put from Pin2 to Pin6, the gain will go up to 200 (46dB). If a resistor is placed in series with the capacitor, the gain can be set to any value from 20 to 200. A 10μf Electrolytic with positive to Pin6 is a usual value.

Additional external components can be placed in parallel with the internal feedback resistors to tailor the gain and frequency response for inidividual applications. For example, a series RC from Pin6 to Pin13 (paralleling the internal 15kΩ resistor) yields 6dB effective bass boost if R ≅ 15kΩ and Pin2 is open. If Pin2 and Pin6 are bypassed, then R as low as 2kΩ can be used. This restriction is because the amplifier is only compensated for closed–loop gains greater than 9V/V.

Input Biasing

When using NTE825 with higher gains (bypassing the internal 1.35kΩ resistor between Pin2 and Pin6) it is necessary to bypass the unused input, preventing degradation of gain and possible instabilities. This is done with a 0.1μF capacitor or a short to GND depending on the DC source resistance on the driven input.

Pin Connection Diagram