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NTE7000
Integrated Circuit
5W Audio Amplifier with Muting

Description:

The NTE7000 is a monolithic integrated circuit in a 16–Lead DIP type package intended for use as a low frequency power amplifier in a wide range of applications in radio and TV sets.

Features:

- Muting Facility
- Protection Against Chip Over Temperature
- Very Low Noise
- High Supply Voltage Rejection
- Low "Switch–On" Noise
- Voltage Range: 4V to 30V

Absolute Maximum Ratings:

Supply Voltage, V_S 30V
Output Peak Current, I_O
Non–Repetitive 3A
Repetitive 2.5A
Input Voltage, V_I . . . . . 0 to $+V_S$ V
Differential Input Voltage, V_I . . . . . ±7V
Muting Threshold Voltage, V_{11} . . . . . V_S V
Power Dissipation, P_{tot}
T_A = +80°C 1W
T_C = +60°C 6W
Junction Temperature Range, T_j . . . . . –40° to +150°C
Storage Temperature Range, T_{stg} . . . . . –40° to +150°C

Electrical Characteristics: (T_A = +25°C, R_{th}(heatsink) = 20°C/W, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Voltage	V_S		4	–	30	V
Quiescent Output Voltage	V_O	V_S = 4V	1.6	2.1	2.5	V
		V_S = 14V	6.7	7.2	7.8	V
		V_S = 30V	14.4	15.5	16.8	V

Electrical Characteristics (Cont'd): (T_A = +25°C, R_{th}(heatsink) = 20°C/W, unless otherwise specified)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
Quiescent Drain Current	I_d	V_s = 4V		–	15	–	mA
		V_S = 14V		–	17	–	mA
		V_S = 30V		–	21	35	mA
Output Stage Saturation Voltage	V_{CEsat}	I_C = 1A		–	0.5	–	V
		I_C = 2A		–	1	–	V
Output Power	P_O	d = 10%, f = 1kHz	V_S = 9V, R_L = 4Ω , Note 1	2.2	2.5	–	W
			V_S = 14V, R_L = 4Ω	5	5.5	–	W
			V_S = 18V, R_L = 8Ω	5	5.5	–	W
			V_S = 24V, R_L = 16Ω	4.5	5.3	–	W
Harmonic Distortion	d	f = 1kHz	V_S = 9V, R_L = 4Ω, P_O = 50mW to 1.5W	–	0.1	–	%
			V_S = 14V, R_L = 4Ω, P_O = 50mW to 3W	–	0.1	–	%
			V_S = 18V, R_L = 8Ω, P_O = 50mW to 3W	–	0.1	–	%
			V_S = 24V, R_L = 16Ω, P_O = 50mW to 3W	–	0.1	–	%
Input Sensitivity	V_i	f = 1kHz	V_S=9V, R_L=4Ω, P_O=2.5W	–	37	–	mV
			V_S=14V, R_L=4Ω, P_O=5.5W	–	49	–	mV
			V_S=18V, R_L=8Ω, P_O=5.5W	–	73	–	mV
			V_S=24V, R_L=16Ω, P_O=5.3W	–	100	–	mV
Input Saturation Voltage (rms)	V_i	V_S = 9V		0.8	–	–	V
		V_S = 14V		1.3	–	–	V
		V_S = 18V		1.8	–	–	V
		V_S = 24V		2.4	–	–	V
Input Resistance (Pin8)	R_i	f = 1kHz		60	100	–	KΩ

Note 1. With an external resistor of 100Ω between Pin3 and $+V_S$.

Electrical Characteristics (Cont'd): (T_A = +25°C, R_{th}(heatsink) = 20°C/W, unless otherwise specified)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
Drain Current	I_d	f = 1kHz	V_S=9V, R_L=4Ω, P_O=2.5W	–	380	–	mA
			V_S=14V, R_L=4Ω, P_O=5.6W	–	550	–	mA
			V_S=18V, R_L=8Ω, P_O=5.5W	–	410	–	mA
			V_S=24V, R_L=16Ω, P_O=5.3W	–	295	–	mA
Efficiency	η	f = 1kHz	V_S=9V, R_L=4Ω, P_O=2.5W	–	73	–	%
			V_S=14V, R_L=4Ω, P_O=5.5W	–	71	–	%
			V_S=18V, R_L=8Ω, P_O=5.6W	–	74	–	%
			V_S=24V, R_L=16Ω, P_O=5.3W	–	75	–	%
Small Signal Bandwidth (–3dB)	BW	V_S = 14V, R_L = 4Ω, P_O = 1W		40 to 40,000			Hz
Voltage Gain (Open Loop)	G_V	V_S = 14V, f = 1kHz		–	75	–	dB
Voltage Gain (Closed Loop)	G_V	V_S = 14V, R_L = 4Ω, f = 1kHz, P_O = 1W		39.5	40.0	40.5	dB
Total Noise Input	e_N	R_g = 50Ω		–	1.2	–	μV
		R_g = 1kΩ		–	1.3	–	
		R_g = 10kΩ		–	1.5	4.0	
		Note 2	R_g = 50Ω	–	2.0	–	
			R_g = 1kΩ	–	2.0	–	
			R_g = 10kΩ	–	2.2	5.0	
Signal to Noise Ratio	S/N	V_S = 14V, P_O = 5.5W, R_L = 4Ω	R_g = 10kΩ	–	90	–	dB
			R_g = 0	–	92	–	
			R_g = 10kΩ, Note 2	–	87	–	
			R_g = 0, Note 2	–	87	–	
Supply Voltage Rejection	SVR	V_S = 18V, R_L = 8Ω, R_G = 10kΩ, f_{ripple} = 100Hz, V_{ripple} = 0.5V_{rms}		40	50	–	dB
Thermal Shut–Down Case Temperature	T_{sd}	P_{tot} = 2.5W		–	115	–	°C

Note 2. Filter with noise bandwidth: 22Hz to 22kHz.

Muting Function:

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Muting–Off Threshold Voltage (Pin4)	$V_{T(OFF)}$		1.9	–	4.7	V
Muting–On Threshold Voltage (Pin4)	$V_{T(ON)}$		0	–	1.3	V
			6.2	–	V_S	
Input Resistance (Pin5)	R_5	Muting Off	80	200	–	kΩ
		Muting On	–	10	30	Ω
Input Resistance (Pin4)	R_4		150	–	–	kΩ
Muting Attenuation	A_T	$R_g + R_1 = 10kΩ$	50	60	–	dB

Pin Connection Diagram