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NTE7114 Integrated Circuit Audio Power Amplifier, Quad 11W (2 x 22W)

Description:

The NTE7114 is an integrated class-B output amplifier in a 17-Lead Staggered SIP type package designed for use in car radio applications. The circuit contains 4 x 11W single-ended or 2 x 22W bridge amplifiers.

Features:

- Few External Components
- Flexible in Use: Quad Single-Ended or Stereo BTL
- High Output Power
- Low Offset Voltage at Outputs (Important for BTL)
- Fixed Gain
- Good Ripple Rejection
- Mute/Stand-by Switch
- AC & DC Short-Circuit-Safe to GND and V_P
- Load Dump Protection
- Thermally Protected
- Protected Against Electrostatic Discharge
- Low Thermal Resistance
- Capable of Handling High Energy on Output ($V_P = 0V$)
- Identical Inputs (Inverting & Non-Inverting)

Absolute Maximum Ratings:

Supply Voltage, V_P	
Operating	18V
Non-Operating	30V
Load Dump Protected (During 50ms, $t_r \leq 2.5ms$)	45V
Peak Output Current, I_{OM}	
Repetitive	4A
Non-Repetitive	6A
Total Power Dissipation, P_{tot}	60W
AC & DC Short-Circuit-Safe Voltage, V_{PSC}	18V
Energy Handling Capability at Outputs ($V_P = 0V$)	200mJ
Reverse Polarity, V_{PR}	6V
Junction Temperature, T_J	+150°C
Storage Temperature Range, T_{stg}	-55° to +150°C

DC Characteristics: ($V_P = 14.4V$, $T_A = +25^\circ C$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply						
Supply Voltage Range	V_P	Note 1	8.0	14.4	18.0	V
Total Quiescent Current	I_{tot}		–	80	180	mA
DC Output Voltage	V_O	Note 2	–	8.9	–	V
DC Output Offset Voltage	$ \Delta V_O $		–	–	100	nV
Mute/Stand-by Switch						
Switch-ON Voltage Level	V_{ON}		8.5	–	–	V
Mute Condition	V_{mute}		3.3	–	6.4	V
Output Signal in Mute Position	V_O	$V_I = 1V$ (max), $f = 1kHz$	–	–	2	mV
DC Output Offset Voltage (Between Pins 6 to 8 & 10 to 12)	$ \Delta V_O $		–	–	100	mV
Stand-by Condition	V_{sb}		0	–	2	V
DC Current in Stand-by Condition	I_{sb}		–	–	100	μA
Switch-ON Current	I_{sw}		–	12	40	μA

Note 1. The circuit is DC adjusted at $V_P = 6V$ to $18V$ and AC operating at $V_P = 8.5V$ to $18V$.

Note 2. At $18V < V_P < 30V$ the DC output voltage $\leq V_P/2$.

AC Characteristics: ($V_P = 14.4V$, $R_L = 4\Omega$, $f = 1kHz$, $T_A = +25^\circ C$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Stereo BTL Application						
Output Power	P_O	THD = 0.5%	15	17	–	W
		THD = 0.5%, $V_P = 13.2V$	–	12	–	W
		THD = 10%	20	22	–	W
		THD = 10%, $V_P = 13.2V$	–	17	–	W
Total Harmonic Distortion	THD	$P_O = 1W$	–	0.1	–	%
Power Bandwidth	BW	THD = 0.5%, $P_O = -1dB$, w.r.t = 15W	20 to 15000			Hz
Low Frequency Roll-Off	f_L	-1dB, Note 3	–	45	–	Hz
High Frequency Roll-Off	f_H	-1dB, Note 3	20	–	–	kHz
Closed Loop Voltage Gain	G_V		25	26	27	dB
Supply Voltage Ripple Rejection ON	RR	Note 4	48	–	–	dB
Mute			48	–	–	dB
Stand-by			80	–	–	dB
Input Impedance	$ Z_i $		25	30	38	k Ω

Note 3. Frequency response externally fixed.

Note 4. Ripple Rejection measured at the output with source impedance of 0Ω (maximum ripple amplitude of 2V) and a frequency between 100Hz and 20kHz.

AC Characteristics (Cont'd): ($V_P = 14.4V$, $R_L = 4\Omega$, $f = 1kHz$, $T_A = +25^\circ C$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
Stereo BTL Application (Cont'd)							
Noise Output Voltage (rms) ON	$V_{NO(rms)}$	$R_S = 0\Omega$, Note 5	-	70	-	μV	
		$R_S = 10k\Omega$, Note 5	-	100	200	μV	
		Note5 & Note 6	-	60	-	μV	
Mute							
Channel Separation	α	$R_S = 10\Omega$, Note 5	-	70	-	dB	
Channel Unbalance	$ \Delta G_V $		-	-	1	dB	
Quad Single-Ended Application							
Power Output	P_O	THD = 0.5%, Note 7	4.0	5.0	-	W	
		THD = 0.5%, $R_L = 2\Omega$, Note 7	7.5	8.5	-	W	
		THD = 10%, Note 7	5.5	6.0	-	W	
		THD = 10%, $R_L = 2\Omega$, Note 7	10.0	11.0	-	W	
Total Harmonic Distortion	THD	$P_O = 1W$	-	0.1	-	%	
Low Frequency Roll-Off	f_L	-3dB, Note 3	-	45	-	Hz	
High Frequency Roll-Off	f_H	-1dB, Note 3	20	-	-	kHz	
Closed Loop Voltage Gain	G_V		19	20	21	kHz	
Supply Voltage Ripple Rejection ON	RR	Note 4	48	-	-	dB	
			Mute	48	-	-	dB
			Stand-by	80	-	-	dB
Input Impedence	$ Z_i $		50	60	75	$k\Omega$	
Noise Output Voltage (rms) ON	$V_{NO(rms)}$	$R_S = 0\Omega$, Note 5	-	50	-	μV	
		$R_S = 10k\Omega$, Note 5	-	70	100	μV	
		Note5 & Note 6	-	50	-	μV	
Mute							
Channel Separation	α	$R_S = 10\Omega$, Note 5	-	70	-	dB	
Channel Unbalance	$ \Delta G_V $		-	-	1	dB	

Note 3. Frequency response externally fixed.

Note 4. Ripple Rejection measured at the output with source impedance of 0Ω (maximum ripple amplitude of 2V) and a frequency between 100Hz and 20kHz.

Note 5. Noise voltage measured in a bandwidth of 20Hz to 20kHz.

Note 6. Noise output voltage independent of R_S ($V_I = 0V$).

Note 7. Output power is measured directly at the output pins on the IC.

Pin Connection Diagram
(Front View)

17	(+) Input 2
16	(-) Input 2
15	N.C.
14	Mute/Standby
13	(+) V _S 2
12	Output 4
11	GND 2
10	Output 3
9	N.C.
8	Output 2
7	GND 1
6	Output 1
5	(+) V _S 1
4	Ripple Rejection
3	Signal GND
2	(-) Input 1
1	(+) Input 1

