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NTE7240
Integrated Circuit
56 Watt Audio Power Amplifier w/Mute
11–Lead Staggered SIP Type Package

Description:

The NTE7240 is a high–performance audio power amplifier in an 11–Lead staggered SIP type package capable of delivering 56W of continuous average power to an 8Ω load with 0.1% THD+N from 20Hz to 20kHz.

The performance of the NTE7240, utilizing its Self Peak Instantaneous Temperature (°Ke) (SPiKe) protection circuitry, puts it in a class above discrete and hybrid amplifiers by providing an inherently, dynamically protected Safe Operating Area (SOA). SPiKe protection means that these parts are completely safeguarded at the output against overvoltage, undervoltage, overloads, including shorts to the supplies, thermal runaway, and instantaneous temperature peaks.

The NTE7240 maintains an excellent signal–to–noise ratio of greater than 95dB (min) with a typical low noise floor of 2.0μV. It exhibits extremely low THD+N values of 0.06% at the rated output into the rated load over the audio spectrum, and provides excellent linearity with an IMD (SMPTE) typical rating of 0.004%.

Features:

- 56W Continuous Average Output Power into 8Ω
- 100W Instantaneous Peak Output Power Capability
- Signal–to–Noise Ratio ≥ 95dB (Min)
- An Input Mute Function
- Output Protection from a Short to Ground or to the Supplies Via Internal Current Limiting Circuitry
- Output Over–Voltage Protection against Transients from Inductive Loads
- Supply Under–Voltage Protection, no Allowing Internal Biasing to Occur when $|V_{EE}| + |V_{CC}| \le 12V$, thus Eliminating Turn–On an Turn–Off Transients
- Wide Supply Range: 20V to 94V

Applications:

- Component Stereo
- Compact Stereo
- Self–Powered Speakers
- Surround–Sound Amplifiers
- High–End Stereo TVs

RoHS 2002/95/EC

Absolute Maximum Ratings: (Note 1, Note 2)

Supply Voltage |V+| + |V−| (No Signal) 94V
Supply Voltage |V+| + |V−| (Input Signal) 84V
Common Mode Input Voltage . . . . . (V+ or V−} and |V+| + |V−| ≤ 80V
Differential Input Voltage 60V
Output Current . . . . . Internally Limited
Power Dissipation (Note 3) 125W
ESD Susceptibility (Note 4) 3000V
Operating Junction Temperature (Note 5) . . . . . +150°C
Storage Temperature Range . . . . . −40° to +150°C
Lead Temperature (During Soldering, 10sec max) . . . . . +260°C
Thermal Resistance, Junction−to−Ambient, R_{thJA} . . . . . 43°C/W
Thermal Resistance, Junction−to−Case, R_{thJC} . . . . . 1°C/W

Note 1. Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Recommend Operating Conditions indicate conditions for which the device is functional. Electrical Characteristics state AC and DC electrical specifications under particular test conditions and specific performance limits. This assumes that the device is within the Recommended Operating Conditions. The typical value is a good indication of device performance.
Note 2. All voltages are measured with respect to the GND pin (Pin7), unless otherwise specified.
Note 3. For operating at case temperatures above +25°C, the device must be derated based on a +150°C maximum junction temperature an a thermal resistance of R_{thJC} = 1.0°C/W (junction−to−case).
Note 4. Human body model. 100pF discharged through a 1.5kΩ resistor.
Note 5. The operating junction temperature maximum is +150°C, however, the Instantaneous Safe Operating Area temperature is +250°C.

Recommended Operating Conditions: (Note 1, Note 2, Note 6)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Voltage	|V+| + |V−|		24	−	84	V
Temperature Range		$T_{MIN} \le T_A \le T_{MAX}$	−20	T_A	+85	°C

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Note 2. All voltages are measured with respect to the GND pin (Pin7), unless otherwise specified.
Note 6. Operating is specified up to 84V, however, distortion may be introduced from SPiKe Protection Circuitry when operating above 70V if proper thermal considerations are not taken into account.

Electrical Characteristics: (V+ = +35V, V− = −35V, I_{MUTE} = −0.5mA, R_L = 8Ω, T_A = +25°C unless otherwise specified. Note 1, Note 2, Note 7)

Parameter	Symbol	Test Conditions	Typ	Max	Unit
Power Supply Voltage (Note 8)	|V+| + |V−|	V_{PIN7} − V− ≥ 9V	18	24	V (min
			−	84	V (max)
Mute Attenuation	A_M	Pin8 Open or at 0V, Mute: On Current out of Pin8 > 0.5mA Mute: Off	120	80	dB (min)

Electrical Characteristics (Cont'd): ($V+ = +35V$, $V- = -35V$, $I_{MUTE} = -0.5mA$, $R_L = 8\Omega$, $T_A = +25°C$ unless otherwise specified. Note 1, Note 2, Note 7)

Parameter	Symbol	Test Conditions	Typ	Max	Unit
Output Power (Continuous Average)	P_O	THD + N = 0.1% (max), f = 1kHz; f = 20kHz	56	40	W (min)
Instantaneous Peak Output Power	Peak P_O		100	–	W
Total Harmonic Distortion Plus Noise	THD + N	40W, 20Hz ≤ f ≤ 20kHz, A_V = 26dB	0.06	–	%
Slew Rate	SR	$V_{IN} = 1.2V_{rms}$, f = 10kHz, Square–Wave, $R_L = 2k\Omega$, Note 9	11	5	V/μs (min)
Total Quiescent Power Supply Current	I+	$V_{CM} = 0V$, $V_O = 0V$, $I_O = 0A$, $I_{mute} = 0A$	30	70	mA (max)
Input Offset Voltage	V_{OS}	$V_{CM} = 0V$, $I_O = 0mA$	1	15	mV (max)
Input Bias Current	I_B	$V_{CM} = 0V$, $I_O = 0mA$	0.2	1.0	μA (max)
Input Offset Current	I_{OS}	$V_{CM} = 0V$, $I_O = 0mA$	0.01	0.2	μA (max)
Output Current Limit	I_O	$\|V+\| = \|V-\| = 12V$, $t_{ON} = 10ms$, $V_O = 0V$	6	4	A (min)
Output Dropout Voltage (Note 10)	V_{OD}	$\|V+ - V_O\|$, V+ = 20V, $I_O = +100mA$	1.6	5	V (max)
		$\|V_O - V-\|$, V– = –20V, $I_O = -100mA$	2.7	5	V (max)
Power Supply Rejection Ratio	PSRR	V+ = 40V, V– = –40V to –20V, $V_{CM} = 0V$, $I_O = 0mA$	120	85	dB (min)
		V+ = 40V to 20V, V– = –40V, $V_{CM} = 0V$, $I_O = 0mA$	120	85	dB (min)
Common Mode Rejection Ratio	CMRR	V+ = 60V to 20V, V– = –20V to –60V, V_{CM} = 20V to –20V, $I_O = 0mA$	120	80	dB (min)
Open Loop Voltage Gain	A_{VOL}	$\|V+\| = \|V-\| = 40V$, $R_L = 2k\Omega$, $\Delta V_O = 60V$	120	90	dB (min)
Gain–Bandwidth Product	GBWP	$\|V+\| = \|V-\| = 40V$, $f_o = 100kHz$, $V_{IN} = 50mV_{rms}$	8	2	MHz (min)
Input Noise	e_{IN}	IHF — A Weighting Filter, $R_{IN} = 600\Omega$ (Input Referred)	2.0	8.0	μV (max)
Signal–to–Noise Ratio	SNR	P_O = 1W, A–Weighted, Measured at 1Khz, $R_S = 25\Omega$	98	–	dB
		P_O = 40W, A–Weighted, Measured at 1Khz, $R_S = 25\Omega$	114	–	dB
		P_{pk} = 100W, A–Weighted, Measured at 1Khz, $R_S = 25\Omega$	122	–	dB
Intermodulation Distortion Test	IMD	60Hz, 7kHz, 4:1 (SMPTE)	0.004	–	%
		60Hz, 7kHz, 1:1 (SMPTE)	0.006	–	%

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Note 2. All voltages are measured with respect to the GND pin (Pin7), unless otherwise specified.

Note 7. Typicals are measured at +25°C and represent the parametric norm.

Note 8. V– must have at least –9V at its pin with reference to ground in order for the under–voltage protection circuitry to be disabled.

Note 9. The feedback compensation network limits the bandwidth of the closed–loop response and so the slew rate will be reduced due to the high frequency roll–off. Without feedback compensation, the slew rate is typically 16V/μs.

Note10. The output dropout voltage is the supply voltage minus the clipping voltage.

Pin Connection Diagram
(Front View)