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NTE1851
Integrated Circuit
Audio Amplifier, 24W BTL

DISCONTINUED

Description:

The NTE1851 is a monolithic integrated class–B amplifier in a 13–Lead Staggered SIP type package primarily developed for car radio applications, and also to drive low–impedance loads (down to 1.6Ω). At a supply voltage V_{CC} = 14.4V, an output power of 21W can be delivered into a 4Ω BTL (Bridge–Tied Load), or, when used as a stereo amplifier, it delivers 2 x 11W into 2Ω or 2 x 6.5W into 4Ω.

Features:

- Flexibility In Use – Mono BTL as well as Stereo
- High Output Power
- Low Offset Voltage at the Output (Important for BTL)
- Large Usable Gain Variation
- Very Good Ripple Rejection
- Internal Limited Bandwidth for High Frequencies
- Low Standby Current Possiblity (1μA Typ), to Simplify Required Switches: TTL Drive Possible
- Low Number of Small–Sized External Components
- High Reliability
- Load Dump Protection
- AC and DC Short–Circuit Safe to Ground up to V_{CC} = 18V
- Thermal Protection
- Speaker Protection in Bridge Configuration
- SOAR Protection
- Outputs Short–Circuit Safe to Ground in BTL
- Reverse–Polarity Safe

Applications:

- Car Radio Applications
- Drive Low Impedance Loads
- Stereo Amplifier

Absolute Maximum Ratings:

Supply Voltage (Pin10), V_{CC}
- Operating 18V
- Non–Operating 28V

Supply Voltage (During 50ms Load Dump Protection), V_{CC} 45V
Peak Output Current, I_{OM} 8A
Crystal Temperature, T_C . . . . . +150°C
Storage Temperature Range, T_{stg} . . . . . –65° to +150°C
AC and DC Short–Circuit Safe Voltage 18V
Reverse Polarity 10V

DC Electrical Characteristics:

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Voltage Range (Pin10)	V_{CC}		6	–	18	V
Repetitive Peak Output Current	I_{ORM}		–	–	4	A
Total Quiescent Current	I_{TOT}		–	75	75	mA
Switching Level 11 OFF	V_{11}		–	–	1.8	V
ON			3.0	–	–	V
Impedance Between Pin10 & Pin6; Pin10 & Pin8	$\|Z_{OFF}\|$	Standby Position V_{11} < 1.8V	100	–	–	kΩ
Standby Current	I_{SB}	V_{11} = 0 to 0.8V	–	1	100	μA
Switch−On Current (Pin11)	I_{SO}	$V_{11} \le V_{10}$	–	10	100	μA

AC Electrical Characteristics: (T_A = +25°C, V_{CC} = 14.4V, f = 1kHz unless otherwise specified)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
Bridge−Tied Load Application (BTL)							
Output Power with Bootstrap	P_O	R_L = 4Ω	V_{CC} = 14.4V, d_{TOT} = 0.5%	15.5	18.0	–	W
			V_{CC} = 14.4V, d_{TOT} = 10%	20	24	–	W
			V_{CC} = 13.2V, d_{TOT} = 0.5%	–	15	–	W
			V_{CC} = 13.2V, d_{TOT} = 10%	–	20	–	W
Open−Loop Voltage Gain	G_O			–	75	–	dB
Closed−Loop Voltage Gain	G_C	Note 2		–	40	–	dB
Output Power without Bootstrap	P_O	Note 3	V_{CC} = 14.4V, d_{TOT} = 0.5%	–	12	12	W
			V_{CC} = 14.4V, d_{TOT} = 10%	–	15	15	W
			V_{CC} = 13.2V, d_{TOT} = 0.5%	–	9	9	W
			V_{CC} = 13.2V, d_{TOT} = 10%	–	12	12	W
Frequency Response at −3dB	B	Note 4		20	–	20	Hz
Input Impedance	$\|Z_i\|$	Note 5		1	–	–	MΩ
Noise Input Voltage (RMS Value)	$V_{N(RMS)}$	R_S = 0Ω	f = 20Hz to 20kHz	–	0.2	0.2	mV
		R_S = 10kΩ		–	0.35	0.35	mV
	V_N			–	0.25	0.8	mV
Supply Voltage Ripple Rejection	RR	f = 100Hz		42	50	50	dB
DC Output Offset Voltage Between the Outputs	$\|\Delta V_{5-9}\|$			–	2	50	mV
Loudspeaker Protection (All Conditions) Maximum DC Voltage (Across the Load)	$\|\Delta V_{5-9}\|$			–	–	1	V
Power Bandwidth	B	−1dB, d_{TOT} = 0.5%		30	–	40	kHz

Note 1. The internal circuit impedance at Pin11 is > 5kΩ if $V_{11} > V_{10}$.
Note 2. Closed−Loop voltage gain can be chosen between 32 and 56dB (BTL), and is determined by external components.
Note 3. Without the bootstrap the 100μF capacitor between Pin5 and Pin6 (Pin8 and Pin9) can be omitted. Pin6, Pin8, and Pin10 have to be interconnected.
Note 4. Frequency response externally fixed.
Note 5. The input impedance in the test circuit is typically 100kΩ.

AC Electrical Characteristics (Cont'd): (T_A = +25°C, V_{CC} = 14.4V, f = 1kHz unless otherwise specified)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
Stereo Application							
Output Power with Bootstrap	P_O	d_{TOT} = 10% Note 6	V_{CC} = 14.4V, R_L = 4Ω	6	7	–	W
			V_{CC} = 14.4V, R_L = 2Ω	10	12	–	W
			V_{CC} = 13.2V, R_L = 4Ω	–	6	–	W
			V_{CC} = 13.2V, R_L = 4Ω	–	10	–	W
Output Power with Bootstrap	P_O	d_{TOT} = 0.5% Note 6	V_{CC} = 14.4V, R_L = 4Ω	–	5.5	–	W
			V_{CC} = 14.4V, R_L = 2Ω	–	9.0	–	W
			V_{CC} = 13.2V, R_L = 4Ω	–	4.5	–	W
			V_{CC} = 13.2V, R_L = 4Ω	–	7.5	–	W
Output Power without Bootstrap	P_O	d_{TOT} = 10%, V_{CC} = 14.4V, R_L = 4Ω, Note 3, Note 6, & Note 7		–	6	–	W
Frequency Response at −3dB	B	Note 4		40	–	20	kHz
Supply Voltage Ripple Rejection	RR	Note 8		–	50	–	dB
Channel Separation	α	R_S = 10kΩ, f = 1kHz		40	50	–	dB
Closed−Loop Voltage Gain	G_C	Note 9		–	40	–	dB
Noise Input Voltage (RMS Value)	$V_{N(RMS)}$	R_S = 0Ω	f = 20Hz to 20kHz	–	0.15	–	mV
		R_S = 10kΩ		–	0.25	–	mV
	V_N			–	0.2	–	mV

Note 1. The internal circuit impedance at Pin11 is > 5kΩ if $V_{11} > V_{10}$.
Note 2. Closed−Loop voltage gain can be chosen between 32 and 56dB (BTL), and is determined by external components.
Note 3. Without the bootstrap the 100μF capacitor between Pin5 and Pin6 (Pin8 and Pin9) can be omitted. Pin6, Pin8, and Pin10 have to be interconnected.
Note 4. Frequency response externally fixed.
Note 5. The input impedance in the test circuit is typically 100kΩ.
Note 6. Output power is measured directly at the output pins of the IC.
Note 7. A resistor of 56kΩ between Pin3 and Pin7 to reach symmetrical clipping.
Note 8. Supply voltage ripple rejection measured with a source impedance of 0Ω (Maximum ripple amplitude: 2V).
Note 9. Closed−Loop voltage gain can be chosen between 26 and 50dB (Stereo), and is determined by external components.

Pin Connection Diagram
(Front View)