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NTE1633
Integrated Circuit
TV Sound Channel w/DC Controls

Description:

The NTE1633 is a complete TV sound channel in a 20–Lead DIP type package with DC tone and volume controls plus separate VCR input and output connections. Supplied in a 20–pin DIP, the device delivers an output power of 4W into 16Ω (d = 10%, V_S = 24V) or 1.5W into 8Ω (d = 10%, V_S = 12V). Included in the NTE1633 are: IF amplifier limiter, active low–pass filter, AF preamplifier and power amplifier, turnoff muting, mute circuit and thermal protection.

High output, high sensitivity, excellent AM rejection and low distortion make the device suitable for use in TVs of almost any type. Further, no screening is necessary because the device is free of radiation problems.

Features:

- Separate VCR Input and Output Pins
- 4W Output Power into 16Ω
- No Screening Required
- High Sensitivity
- Excellent AM Rejection
- Low Distortion
- DC Tone/Volume Controls
- Thermal Protection

Absolute Maximum Ratings:

Supply Voltage (Pin18), V_S 28V
Voltage at Pin1, V_i . . . . . $\pm V_S$
Input Voltage (Pin2), V_i . . . . . $1V_{pp}$
Output Peak Current, I_O
  Repetitive 1.5A
  Non–Repetitive 2A
Current (Pin4), I_4 . . . . . 10mA
Power Dissipation (T_{pins} = +90°C), P_{tot} 4.3W
Power Dissipation (T_A = +70°C), P_{tot} 1.0W
Operating Junction Temperature Range, T_J . . . . . –40° to 150°C
Storage Temperature Range, T_{stg} . . . . . –40° to 150°C
Maximum Thermal Resistance, Junction–to–Pins, $R_{thJPins}$ . . . . . 14°C/W
Maximum Thermal Resistance, Junction–to–Ambient (Note 1), R_{thJA} . . . . . 80°C/W

Note 1. Obtained with GND pins soldered to printed circuit with minimized copper area.

Electrical Characteristics: V_S = 24V, S1: ON, $\Delta f = \pm 25kHz$, V_i = 1mV, P_1 = 12kΩ, f_o = 4.5MHz, f_m = 400Hz, T_A = +25°C unless otherwise indicated)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
DC Characteristics						
Supply Voltage (Pin18)	V_S	P_2 = 12kΩ	10.8	–	27	V
Quiescent Output Voltage (Pin18)	V_O		11	12	13	V
DC Voltage (Pin1)	V_1	P_2 = 12kΩ, R_1 = 270kΩ	–	5.3	–	V
DC Voltage (Pin4)	V_4	P_2 = 12kΩ	–	3.2	–	V
Quiescent Drain Current (Pin4)	I_d		–	32	–	mA
IF Amplifier & Detector						
Input Limiting Voltage @ Pin2 (–3dB)	$V_{i(threshold)}$	$V_O = 4V_{rms}$	–	50	100	µV
Recovered Audio Voltage (Pin9)	V_9	$\Delta f = \pm 7.5kHz$, P_2 = 12kΩ	140	200	280	mV
Amplitude Modulation Rejection	AMR	m = 0.3, V_1 = 1mV, $V_O = 4V_{rms}$, Note 2	–	60	–	dB
Input Resistance (Pin2)	R_i	Δf = 0, P_2 = 12kΩ	–	30	–	kΩ
Input Capacitance (Pin2)	C_i		–	6	–	pF
De–Emphasis Resistance	R9	C_1 = 60 to 888nF	0.75	1.1	1.5	kΩ
DC Volume Control						
Volume Attenuation (Resistance Control)	K_V	P_2 = 0Ω	–	0	–	dB
		P_2 = 4.3kΩ	20	26	32	dB
		P_2 = 12kΩ	–	88	–	dB
Control Voltage	V_C	K = 0dB	–	0	–	V
		K = 26dB	–	1.3	–	V
		K = 88dB	–	2.6	–	V
Volume Attenuation Thermal Drift (Resistance Control)	$\frac{\Delta K_V}{\Delta T_{pins}}$	T_{pins} = +25° to +85°C, P_2 = 4.3kΩ	–	–0.05	–	$\frac{dB}{°C}$
DC Tone Control						
Tone Cut	K_T	S1: OFF, V_{10} = 200mV, P_1 = 12kΩ to 100kΩ, f_{AF} = 10kHz	–	14	–	dB
Audio Frequency Amplifier						
Output Power (d = 10%)	P_O	V_S = 24V, R_L = 16Ω	3.5	4.1	–	W
		V_S = 12V, R_L = 8Ω	–	1.5	–	
Frequency Response of Audio Amplifier (–3dB)	B	P_O = 1W, R_L = 16Ω, S1: OFF, V_{10} = 200mV $V_O = 4V_{rms}$, @ 400Hz	15	50	–	kHz
Supply Voltage Rejection	SVR	P_2 = 12kΩ, Δ f =0, f_{ripple} = 120Hz	–	26	–	dB

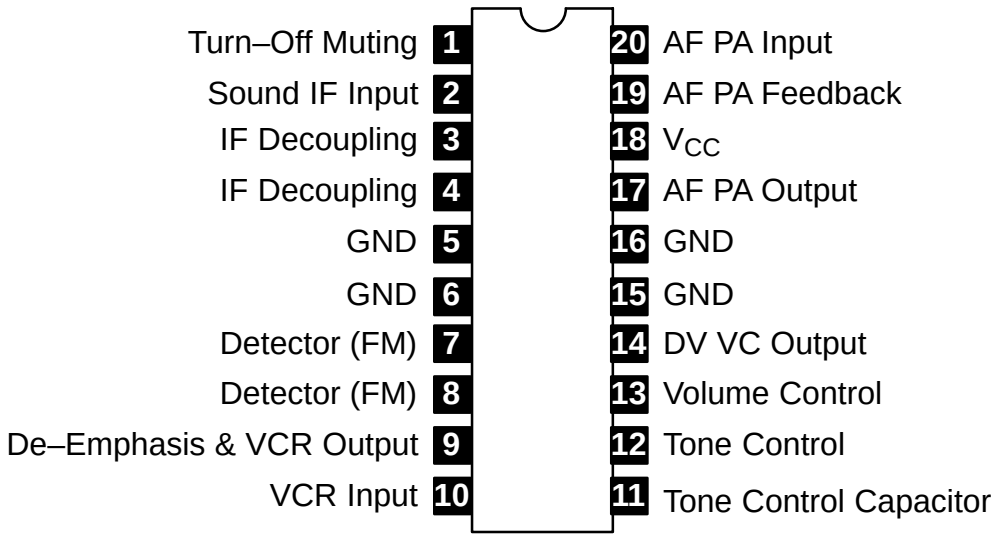
Note 2. Test Bandwidth = 20kHz

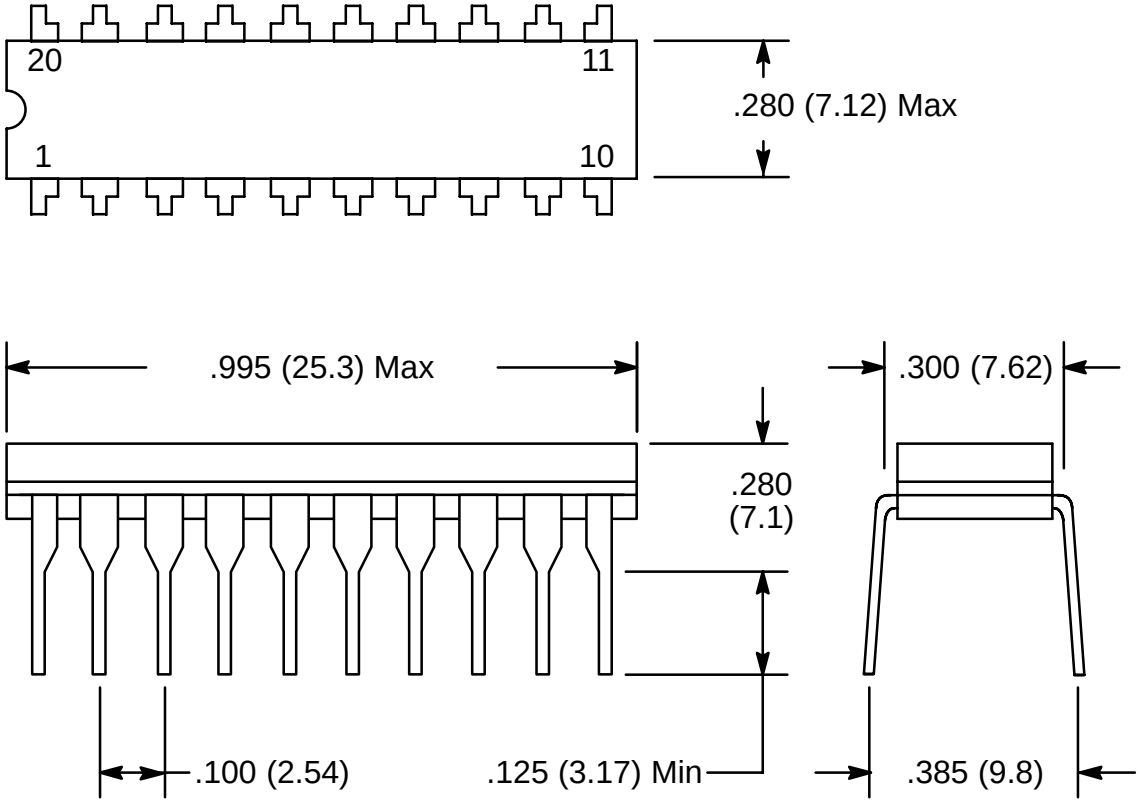
Electrical Characteristics (Cont'd): V_S = 24V, S1: ON, $\Delta f = \pm$ 25kHz, V_i = 1mV, P_1 = 12kΩ, f_o = 4.5MHz, f_m = 400Hz, T_A = +25°C unless otherwise indicated)

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
VCR							
Total Harmonic Distortion of Pin9 Output Signal	d	$\Delta f = \pm 7.5$kHz, V_i = 1mV		–	0.5	–	%
Supply Voltage Rejection at Output Pin9	SVR	Δf = 0, f_{ripple} = 120Hz, P_2 = 12kΩ		–	66	–	dB
Signal–to–Noise Ratio at Output Pin9	$\frac{S+N}{N}$	$\Delta f = \pm 25$kHz, $V_I \geq$ 1mV		–	70	–	dB
Input Voltage (Playback)	V_{10}	V_o = $4V_{rms}$, P_2 = 0, S1: OFF		50	70	100	mV
Input Resistance (Playback)	R_{10}	S1: OFF		10	–	–	kΩ
Total Harmonic Distortion for 20dB Overload of V_{10}	d	S1: OFF, V_{10} = $1V_{rms}$, V_O = $4V_{rms}$		–	0.5	2.0	%
Overall Circuit							
Signal–to–Noise Ratio	$\frac{S+N}{N}$	$V_i \geq$ 1mV, V_O = $4V_{rms}$, Δf = 0, Note 2		–	70	–	dB
Distortion	d	P_O = 50mW, $\Delta f = \pm 7.5$Hz, Note 2	V_S = 24V, R_L = 16Ω	–	0.5	–	%
			V_S = 12V, R_L = 8Ω	–	0.5	–	%
Muting	M	V_O = $4V_{rms}$ @ no V_1; V_1 = 0, Note 2		–	100	–	dB
Deviation Sensitivity	Δf	P_2 = 0 V_O = $4V_{rms}$		–	3	6	kHz

Note 2. Test Bandwidth = 20kHz

Pin Connection Diagram




20
11
1
10
.280 (7.12) Max
.995 (25.3) Max
.300 (7.62)
.280
(7.1)
.100 (2.54)
.125 (3.17) Min
.385 (9.8)