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NTE1635
Integrated Circuit
Speaker Protector/Voltage/Temperature/Overload

Description:

The NTE1635 is a monolithic integrated circuit in an 8–Lead SIP type package designed for use in protecting power amplifiers and speakers in various amplifier and receiver applications.

Features:

- Built–In Relay Driver
- Single Power Source
- Wide Operating Supply Range: 25V to 60V
- Plus and Minus Voltage using One Pin (Both Pin3 and Pin4 Posses the Same Functions and Detect Plus and Minus Voltage)
- AC Voltage Detector (Pin5)
- Circuit Protection by Plus Voltage Detection is Provided by Connecting D1 Diode Externally (Pin6)
- Relay–On Lag Time Adjustable by External Applications
- Short Relay–Off Time (25ms Typ Under the Standard External Applications)

Typical Applications:

- For Speaker Protection, use Pin3 (or Pin4) to Detect Setoff of Quiescent Output DC Voltage and to Turn the Relay Off
- For Power Amplifier Protection, use Pin3 (or Pin4) with an External Thermo–Sensitive Device to Detect the Temperature Increase and to Turn the Relay Off
- Power Amplifier can be Protected by Detecting Overload and Turning the Relay Off with Pin6
- In case of Overload Detection by Constant–Current or by Constant–Voltage Drive using an External Diode D1, the Latch Mechanism keeps the Relay On until the Power is Switched Off
- For Prevention of Pop Noise at Power Off use Pin5. AC Voltage Disappeance is Immediately Detected when the Amp's Switch has been Off. This Minimizes the Relay–Off Time and thus can Prevent Pop Noise Generated by Mute–Off Time Lag

Absolute Maximum Ratings: (T_A = +25°C unless otherwise specified)

Total Power Disipation (T_A = +70°C), P_T 400mW
Operating Temperature Range, T_{opr} . . . . . –20° to +70°C
Storage Temperature Range, T_{stg} . . . . . –55° to +125°C
Supply Voltage (Pin1), $V_{CC(max)}$ 60V
Supply Current (Pin1), $I_{1(max)}$ 80mA

Absolute Maximum Ratings (Cont'd): (T_A = +25°C unless otherwise specified)

Supply Current (Pin3, Note 1), $I_{3(max)}$ . . . . . ±3mA
Supply Current (Pin4, Note 1), $I_{4(max)}$ . . . . . ±3mA
Supply Voltage (Pin5), $V_{5(max)}$ . . . . . –10V
Supply Current (Pin6), $I_{6(max)}$ 3mA
Supply Voltage (Pin7, Note 2), $V_{7(max)}$ 8V
Supply Current (Pin7, Note 2), $I_{7(max)}$ 25mA
Supply Voltage (Pin8), $V_{8(max)}$ . . . . . Less than Pin7
Supply Current (Peak, Pin8), $I_{8(max)}$ 50mA

Note 1. Positive current denotes input current at Pin3 and Pin4, Negative current denotes output current

Note 2. $V_{7(max)}$ = 8V is derived when driven by a constant voltage source without any resistance. When applying current to V_7 throught a resistance V_{CC} the maximum value of input current to Pin7 should be used instead of the above values.

Electrical Characteristics: (V_{CC} = +45V unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Threshold Voltage at Pin3, Positive Side	$+V_{th(3)}$	Apply positive voltage to Pin3 through an external resistance (56kΩ). Measure Pin3 voltage while Pin1 voltage changes from low (1V) to high (45V) during the above process.	0.89	1.20	1.61	V
Threshold Voltage at Pin3, Negative Side	$–V_{th(3)}$	Apply negative voltage to Pin3 through an external resistance (56kΩ). Measure Pin3 voltage while Pin1 voltage changes from low (1V) to high (45V) during the above process.	–1.86	–1.20	–0.84	V
Threshold Voltage at Pin4, Positive Side	$+V_{th(4)}$	Apply positive voltage to Pin4 through an external resistance (56kΩ). Measure Pin4 voltage while Pin1 voltage changes from low (1V) to high (45V) during the above process.	0.89	1.20	1.61	V
Threshold Voltage at Pin4, Negative Side	$–V_{th(4)}$	Apply negative voltage to Pin4 through an external resistance (56kΩ). Measure Pin4 voltage while Pin1 voltage changes from low (1V) to high (45V) during the above process.	–1.86	–1.20	–0.84	V
Threshold Voltage at Pin6	$V_{th(6)}$	Apply voltage to Pin6 through D1. Measure voltage on Pin6 while Pin1 voltage changes from low (1V) to high (45V) during the above process.	0.90	1.15	1.40	V
Threshold AC Voltage at Pin5	$V_{AC(on)}$	Apply AC voltage to Pin5 through D2. Measure AC voltage on Pin5 while Pin1 voltage changes from low (1V) to high (45V) during the above process.	–	2.5	–	V_{rms}
Threshold Voltage at Pin5	$V_{th(5)}$	Apply voltage to Pin5 directly. Measure voltage on Pin5 when Pin1 voltage change from low (1V) to High (45V) during the above process.	–1.8	–1.2	0	V
Current Drain at Pin7	$I_{(7)}$	Measure Pin7 input current when turning relay on.	16.5	18.5	20.5	mA

Pin Connection Diagram
(Front View)