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## NTE1439 Integrated Circuit Dual Attenuator

**Description:**

The NTE1439 is an integrated circuit in a 14-Lead DIP type package which logarithmically controls the throughput (gain) of an audio signal by the DC voltage or resistance value and has 2 circuits. Since voltage is internally stabilized, the stable operations are assured at the allowable supply voltage range (8V to 14.4V). The current source is provided with control circuit so that operation can be controlled by the voltage drop. This device is used for electronic volume control in radio, television, stereo, tape recorder, an transceiver applications.

**Features:**

- Wide Operating Voltage Range
- High Attenuation Level
- Easy to Control Signal Gain with a Simple Circuit
- Less Crosstalk Between Each Channel

**Absolute Maximum Ratings:** ( $T_A = +25^\circ\text{C}$  unless otherwise specified)

|  |                                     |
|--|-------------------------------------|
| Supply Voltage, $V_{CC}$ .....                       | 14.4V                               |
| Circuit Voltage (Note 1), $V_6, V_{13}$ .....        | 6V                                  |
| Circuit Voltage, $V_3, V_{10}$ .....                 | $V_{CC}$                            |
| Total Current Dissipation, $I_{tot}$ .....           | 25mA                                |
| Total Power Dissipation, $P_{tot}$ .....             | 360mW                               |
| Operating Ambient Temperature Range, $T_{opr}$ ..... | $-20^\circ$ to $+75^\circ\text{C}$  |
| Storage Temperature Range, $T_{stg}$ .....           | $-55^\circ$ to $+150^\circ\text{C}$ |

Note 1. DC voltage must not be applied to Pin1, Pin2, Pin8, and Pin9 from the outside. 6V is used as voltage for  $V_6$  and  $V_{13}$  and no larger than  $V_{CC}$  voltage.

**Electrical Characteristics:** ( $T_A = +25^\circ\text{C}$ ,  $V_{CC} = 12\text{V}$  unless otherwise specified)

| Parameter            | Symbol                | Test Conditions   | Min  | Typ | Max  | Unit |
|----------------------|-----------------------|---|------|-----|------|------|
| Gain                 | $G_{V1}$              | $v_i = 100\text{mV}, V_{cont} = 5\text{V}, f = 1\text{kHz}$ | 11.7 | –   | 15.7 | dB   |
|                      | $G_{V2}$              | $v_i = 100\text{mV}, V_{cont} = 4\text{V}, f = 1\text{kHz}$ | 10.5 | –   | 15.0 | dB   |
|                      | $G_{V3}$              | $v_i = 100\text{mV}, V_{cont} = 3\text{V}, f = 1\text{kHz}$ | –14  | –   | 2    | dB   |
| Gain Ratio (Ch2/Ch1) | $G_{V3(2)}/G_{V3(1)}$ | $v_i = 100\text{mV}, V_{cont} = 3\text{V}, f = 1\text{kHz}$ | –6   | –   | +6   | dB   |

Note 2. The same measurement should be applied for Ch2.

**Electrical Characteristics (Cont'd):** ( $T_A = +25^\circ\text{C}$ ,  $V_{CC} = 12\text{V}$  unless otherwise specified)

| Parameter                  | Symbol             | Test Conditions   | Min   | Typ | Max   | Unit          |
|----------------------------|--------------------|---|-------|-----|-------|---------------|
| Residual Noise             | $v_O$              | $v_i = 100\text{mV}$ , $V_C = 1\text{V}$ , $f = 1\text{kHz}$ , $B = 20\text{kHz}$ | –     | –   | 100   | $\mu\text{V}$ |
| Noise                      | $v_N$              | $v_i = 0\text{V}$ , $V_C = 3.5\text{V}$ , $B = 20\text{kHz}$                      | –     | –   | 150   | $\mu\text{V}$ |
| Crosstalk                  | CT                 | $v_i = 500\text{mV}$ , $V_C = 5\text{V}$ , $f = 1\text{kHz}$                      | 60    | –   | –     | dB            |
| Output DC Voltage          | $V_O$              | $V_C = 5\text{V}$   | 5.7   | –   | 8.2   | V             |
| Output Voltage Fluctuation | $\Delta V_O$       | $V_C = 5\text{V}$ to $0\text{V}$  | –0.65 | –   | +0.65 | V             |
| Control Input Current      | $-I_{\text{cont}}$ | $R_{\text{cont}} = 0\ \Omega$   | 0.15  | –   | 0.33  | mA            |
|                            |                    | $R_{\text{cont}} = 20\text{k}\Omega$  | 0.15  | –   | 0.33  | mA            |
| Supply Current             | $I_{CC}$           | $V_C = 5\text{V}$   | –     | –   | 22    | mA            |
| Distortion Factor          | THD                | $v_i = 100\text{mV}$ , $V_C = 5\text{V}$ , $f = 1\text{kHz}$                      | –     | –   | 0.5   | %             |
| $D_6$ Breakdown            | $V_{(\text{BR})D}$ | $I_6, I_{13} = 10\mu\text{A}$   | 6     | –   | –     | V             |

Note 2. The same measurement should be applied for Ch2.

