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## NTE934 Integrated Circuit Positive 3 Terminal Voltage Regulator 13.8V $\pm$ 5%, 5A

**Description:**

The NTE934 positive 3 terminal voltage regulator is a monolithic integrated circuit in a TO3 type package designed for use in applications requiring a well regulated positive output voltage. Outstanding features include full power usage up to 5A of load current, internal current limiting, thermal shutdown, and safe area protection on the chip, providing protection of the series pass Darlington, under most operating conditions. A hermetically sealed steel TO3 package is utilized for high reliability and low thermal resistance. A low-noise temperature stable band-gap reference is the key design factor insuring excellent temperature regulation. This coupled to a very low output impedance insures superior load regulation.

**Features:**

- Guaranteed Power Dissipation: 30W @  $T_C = +57.5^\circ\text{C}$
- Guaranteed Input-Output Differential: +2.5V
- Low Noise, Band Gap Reference
- Remote Sense Capability
- Sample Power Cycled Burn-In
- Guaranteed Thermal Resistance, Junction-to-Case: 2.25°C/W

**Absolute Maximum Ratings:**

|   |                    |
|---|--------------------|
| Input Voltage (Note 1), $V_{IN}$ .....                      | 35V                |
| Power Dissipation, $P_D$ .....                              | Internally Limited |
| Derate Above $T_C = +57.5^\circ\text{C}$ .....              | 444mW/°C           |
| Operating Junction Temperature Range, $T_J$ .....           | -55° to +150°C     |
| Storage Temperature Range, $T_{stg}$ .....                  | -65° to +150°C     |
| Thermal Resistance, Junction-to-Case, $R_{thJC}$ .....      | 2.25°C/W           |
| Lead Temperature (During Soldering, 60sec Max), $T_L$ ..... | +300°C             |

Note 1. Short circuit protection is only assured to  $V_{INmax}$ . In case of short circuit, with input-output voltages approaching  $V_{INmax}$ , regulator may require the removal of the input voltage to restart.

**Electrical Characteristics:** ( $T_J = +25^\circ\text{C}$  unless otherwise specified)

| Parameter                 | Symbol                       | Test Conditions   | Min   | Typ  | Max   | Unit                                |
|---------------------------|------------------------------|---|-------|------|-------|-------------------------------------|
| Output Voltage            | $V_O$                        | $V_{IN} = 16.8\text{V to } 23.8\text{V}$ , $I_O = 10\text{mA to } 5\text{A}$ , Note 2   | 13.11 | 13.8 | 14.49 | V                                   |
| Input–Output Differential | $V_{IN} - V_O$               | $I_O = 5\text{A}$ , $T_J = 0^\circ \text{ to } +125^\circ\text{C}$  | 2.5   | –    | –     | V                                   |
| Line Regulation           | $\text{REG}_{(\text{LINE})}$ | $V_{IN} = 16.8\text{V to } 28.8\text{V}$ , $I_O = 2\text{A}$ , Note 2   | –     | –    | 1.0   | $\%V_O$                             |
| Load Regulation           | $\text{REG}_{(\text{LOAD})}$ | $V_{IN} = 18.8\text{V}$ , $I_O = 10\text{mA to } 5\text{A}$ , Note 2  | –     | –    | 0.6   | $\%V_O$                             |
| Quiescent Current         | $I_Q$                        | $V_{IN} = 16.8\text{V}$ , $I_O = 10\text{mA}$   | –     | –    | 20    | mA                                  |
| Quiescent Current Line    | $I_{Q(\text{LINE})}$         | $V_{IN} = 16.8\text{V to } 23.8\text{V}$ , $I_O = 10\text{mA}$  | –     | –    | 5     | mA                                  |
| Quiescent Current Load    | $I_{Q(\text{LOAD})}$         | $V_{IN} = 16.8\text{V}$ , $I_O = 10\text{mA to } 5\text{A}$   | –     | –    | 5     | mA                                  |
| Current Limit             | $I_{\text{LIM}}$             | $V_{IN} = 18.8\text{V}$ , Note 2  | –     | –    | 6.5   | A                                   |
| Temperature Coefficient   | $T_C$                        | $V_{IN} = 16.8\text{V}$ , $I_O = 0.1\text{A}$ , $T_J = 0^\circ \text{ to } +125^\circ\text{C}$  | –     | –    | 0.02  | $\%V_O/^\circ\text{C}$              |
| Output Noise Voltage      | $V_N$                        | $V_{IN} = 16.8\text{V}$ , $I_O = 0.1\text{A}$ , $T_J = 0^\circ \text{ to } +125^\circ\text{C}$ , Note 3                                       | –     | –    | 10    | $\mu\text{V}_{\text{rms}}/\text{V}$ |
| Ripple Attenuation        | $R_A$                        | $V_{IN} = 18.8\text{V}$ , $I_O = 2\text{A}$ , $T_J = 0^\circ \text{ to } +125^\circ\text{C}$ , Note 4   | 60    | –    | –     | dB                                  |
| Power Dissipation         | $P_D$                        | $V_{IN} - V_{\text{OUT}} = 2.5\text{V to } 10.0\text{V}$ , $I_O = 10\text{mA to } 5\text{A}$ , $T_J = 0^\circ \text{ to } +125^\circ\text{C}$ | –     | –    | 30    | W                                   |

Note 2. Low duty cycle pulse testing with Kelvin connections required. Die temperature changes must be accounted for separately.

Note 3. BW = 10Hz to 100kHz.

Note 4. Ripple attenuation is specified for a  $1\text{V}_{\text{rms}}$ , 120Hz, input ripple. Ripple attenuation is minimum of 60dB at 5V output and is 1dB less for each volt increase in the output voltage.

Note 5.  $V_O = V_C (1 + R1/R2)$

R1 = Resistance from output to control

R2 = Resistance from control to common

