

## NTE971

### Linear Integrated Circuit Voltage Regulator, Negative, -24V, 1A

**Description:**

The NTE924 fixed-voltage regulator is a monolithic integrated circuit in a TO220 type package designed for use in a wide variety of applications including local, on-card regulation. This regulator employs internal current limiting, thermal shutdown, and safe-area compensation. With adequate heat sinking it can deliver output currents in excess of 1A. Although designed primarily as a fixed regulator, this device can be used with external components to obtain adjustable voltages and currents.

**Features:**

- No External Components Required
- Internal Thermal Overload Protection
- Internal Short-Circuit Current Limiting
- Output Transistor Safe-Area Compensation

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

Input Voltage, $V_{IN}$ .....	-40V
Internal Power Dissipation, $P_D$ .....	Internally Limited
Derate Above $+25^\circ\text{C}$ .....	15.4mW/ $^\circ\text{C}$
Internal Power Dissipation ( $T_C = +25^\circ\text{C}$ ), $P_D$ .....	Internally Limited
Derate Above $+75^\circ\text{C}$ .....	200mW/ $^\circ\text{C}$
Maximum Junction Temperature Range, $T_J$ .....	$-55^\circ$ to $+150^\circ\text{C}$
Storage Temperature Range, $T_{stg}$ .....	$-65^\circ$ to $+150^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient, $R_{thJA}$ .....	65 $^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case, $R_{thJC}$ .....	5 $^\circ\text{C}/\text{W}$

**Electrical Characteristics:** ( $V_{IN} = -33\text{V}$ ,  $I_O = 500\text{mA}$ ,  $T_J = 0^\circ$  to  $+125^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
Output Voltage	$V_O$	$T_J = +25^\circ\text{C}$	-23.0	-24.0	-25.0	V	
		$5\text{mA} \leq I_O \leq 1\text{A}$ , $P_O \leq 15\text{W}$ , $-38\text{V} \leq V_{IN} \leq -27\text{V}$	-22.8	-24.0	-25.2	V	
Line Regulation	$\text{Reg}_{Line}$	$T_J = +25^\circ\text{C}$ , Note 1	$-38\text{V} \leq V_{IN} \leq -27\text{V}$	-	31	480	mV
			$-36\text{V} \leq V_{IN} \leq -30\text{V}$	-	14	240	
Load Regulation	$\text{Reg}_{Load}$	$T_J = +25^\circ\text{C}$ , Note 1	$5\text{mA} \leq I_O \leq 1.5\text{A}$	-	60	480	mV
			$250\text{mA} \leq I_O \leq 750\text{mA}$	-	25	240	

**Electrical Characteristics:** ( $V_{IN} = -33V$ ,  $I_O = 500mA$ ,  $T_J = 0^\circ$  to  $+125^\circ C$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Quiescent Current	$I_B$	$T_J = +25^\circ C$	-	4.6	8.0	mA
Quiescent Current Change	$\Delta I_B$	$-38V \leq V_{IN} \leq -27V$	-	-	1.0	mA
		$5mA \leq I_O \leq 1A$	-	-	0.5	
Ripple Rejection	RR	$38V \leq V_{IN} \leq 28V$ , $f = 120Hz$	-	54	-	dB
Dropout Voltage	$V_{IN} - V_O$	$T_J = +25^\circ C$ , $I_O = 1A$	-	2.0	-	V
Output Noise Voltage	$V_n$	$T_A = +25^\circ C$ , $10Hz \leq f \leq 100kHz$	-	10	-	$\mu V/V_O$
Output Resistance	$r_O$	$f = 1kHz$	-	20	-	$m\Omega$
Short-Circuit Current Limit	$I_{sc}$	$T_A = +25^\circ C$ , $V_{IN} = 35V$	-	0.2	-	A
Peak Output Current	$I_{max}$	$T_J = +25^\circ C$	-	2.2	-	A
Average Temperature Coefficient of Output Voltage	$TCV_O$		-	-1.5	-	$mV/^\circ C$

Note 1. Load and line regulation are specified at constant junction temperature. Changes in  $V_O$  due to heating effects must be taken into account separately. Pulse testing with low duty cycle is used.

