

NTE972 Integrated Circuit 3-Terminal Positive Voltage Regulator, 24V

The NTE972 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 1.0 ampere. Although designed primarily as a fixed voltage regulator, this device can be used with external components to obtain adjustable voltages and currents.

Features:

- Output Current in Excess of 1.0 Ampere
- 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}	40Vdc
Power Dissipation ($T_A = +25^\circ\text{C}$), P_D	Internally Limited
Derate above $+25^\circ\text{C}$	15.4mW/ $^\circ\text{C}$
Power Dissipation ($T_C = +25^\circ\text{C}$), P_D	Internally Limited
Derate above $+75^\circ\text{C}$	200mW/ $^\circ\text{C}$
Thermal Resistance, Junction-to-Ambient, R_{thJA}	65 $^\circ\text{C/W}$
Thermal Resistance, Junction-to-Case, R_{thJC}	5 $^\circ\text{C/W}$
Operating Junction Temperature Range, T_J	-55 $^\circ$ to +150 $^\circ\text{C}$
Storage Junction Temperature Range, T_{stg}	-65 $^\circ$ to +150 $^\circ\text{C}$

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	24	25	V
		$5\text{mA} \leq I_O \leq 1\text{A}$, $P_O \leq 15\text{W}$, $27\text{V} \leq V_{in} \leq 38\text{V}$	22.8	24.0	25.2	V
Line Regulation	Reg_{line}	$T_J = +25^\circ\text{C}$, Note 1				
			27V $\leq V_{in} \leq$ 38V	—	31	480 mV
Load Regulation	Reg_{load}	$T_J = +25^\circ\text{C}$, Note 1	30V $\leq V_{in} \leq$ 36V	—	14	240 mV
			5mA $\leq I_O \leq$ 1.5A	—	60	480 mV
			250mA $\leq I_O \leq$ 750mA	—	25	240 mV

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.

Electrical Characteristics (Cont'd): ($V_{in} = 33V$, $I_O = 500mA$, $T_J = 0^{\circ}$ 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	ΔI_B	$27V \leq V_{in} \leq 38V$	–	–	1.0	mA
		$5mA \leq I_O \leq 1A$	–	–	0.5	mA
Ripple Rejection	RR	$28V \leq V_{in} \leq 38V$, $f = 120Hz$	–	54	–	dB
Dropout Voltage	$V_{in} - V_O$	$T_J = +25^{\circ}C$, $I_O = 1A$	–	2	–	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	–	$mV/^{\circ}C$

