

## 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 $^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case, $R_{thJC}$ .....	5 $^\circ\text{C}/\text{W}$
Operating Junction Temperature Range, $T_J$ .....	-55 $^\circ\text{C}$ to +150 $^\circ\text{C}$
Storage Junction Temperature Range, $T_{stg}$ .....	-65 $^\circ\text{C}$ 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	$\text{Reg}_{line}$	$T_J = +25^\circ\text{C}$ , Note 1	$27\text{V} \leq V_{in} \leq 38\text{V}$	-	31	480	mV
			$30\text{V} \leq V_{in} \leq 36\text{V}$	-	14	240	mV
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	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	$\Delta I_B$	$27V \leq V_{in} \leq 38V$	-	-	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	-	$mV/^\circ C$

