

## NTE988 Integrated Circuit Positive 3 Terminal Voltage Regulator, 100mA

**Description:**

The NTE988 is a 3-terminal positive voltage regulator in a TO92 type package and employs internal current-limiting and thermal shutdown, making it essentially indestructible. If adequate heat sinking is provided, this device can deliver up to 100mA output current. The NTE988 is intended for use as a fixed voltage regulator in a wide range of applications including local (on-card) regulation for elimination of noise and distribution problems associated with single-point regulation. In addition, this device can be used with power pass elements to make a high current voltage regulator. When used as a Zener diode/resistor combination replacement, the NTE988 offers an effective output impedance improvement of typically two orders of magnitude, along with lower quiescent current and lower noise.

**Features:**

- Output Current up to 100mA
- No External Components
- Internal Thermal Overload Protection
- Internal Short Circuit Current-Limiting
- Output Voltage Tolerance of  $\pm 5\%$  over the Temperature Range

**Absolute Maximum Ratings:**

Input Voltage,  $V_{IN}$  ..... 35V  
 Internal Power Dissipation,  $P_D$  ..... Internally Limited  
 Operating Junction Temperature Range,  $T_A$  .....  $0^\circ\text{C}$  to  $+125^\circ\text{C}$   
 Storage Temperature Range,  $T_{stg}$  .....  $-65^\circ\text{C}$  to  $+150^\circ\text{C}$   
 Lead Temperature (Soldering, 10 sec),  $T_L$  .....  $+265^\circ\text{C}$

**Electrical Characteristics:** ( $0^\circ \leq T_J \leq +125^\circ\text{C}$ ,  $V_{IN} = 12\text{V}$ ,  $I_O = 40\text{mA}$ ,  $C_{IN} = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , Note 1 unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
Output Voltage	$V_O$	$T_J = +25^\circ\text{C}$	5.95	6.20	6.45	V	
Line Regulation	$V_{R(LINE)}$	$T_J = +25^\circ\text{C}$	$8.5\text{V} \leq V_I \leq 20\text{V}$	–	65	175	mV
			$9.0\text{V} \leq V_I \leq 20\text{V}$	–	55	125	mV

Note 1. The maximum steady state usable output current and input voltage are very dependent on the heat sinking and/or lead length of the package. The data above represents pulse test conditions with junction temperatures as indicated at the initiation of the tests.

**Electrical Characteristics (Cont'd):** ( $0^{\circ} \leq T_J \leq +125^{\circ}\text{C}$ ,  $V_{IN} = 12\text{V}$ ,  $I_O = 40\text{mA}$ ,  $C_{IN} = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , Note 1 unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
Load Regulation	$V_{R(\text{LOAD})}$	$T_J = +25^{\circ}\text{C}$					
		$1\text{mA} \leq I_O \leq 100\text{mA}$	-	13	80	mV	
Output Voltage (Note 2)	$V_O$	$8.5\text{V} \leq V_I \leq 20\text{V}$	$1\text{mA} \leq I_O \leq 40\text{mA}$	5.9	-	6.5	V
		$8.5\text{V} \leq V_I \leq V_{\text{Max}}$	$1\text{mA} \leq I_O \leq 70\text{mA}$	5.9	-	6.5	V
Quiescent Current	$I_Q$		-	2.0	5.5	mA	
Quiescent Current Change With Line With Load	$\Delta I_Q$	$8.0\text{V} \leq V_I \leq 20\text{V}$		-	-	1.5	mA
		$1\text{mA} \leq I_O \leq 40\text{mA}$		-	-	0.1	mA
Noise	$N_O$	$T_A = +25^{\circ}\text{C}$ , $10\text{Hz} \leq f \leq 100\text{kHz}$	-	50	-	$\mu\text{V}$	
Ripple Rejection	$\Delta V_I / \Delta V_O$	$f = 120\text{Hz}$ , $10\text{V} \leq V_I \leq 20\text{V}$ , $T_J = +25^{\circ}\text{C}$	40	46	-	dB	
Dropout Voltage	$V_{DO}$	$T_J = +25^{\circ}\text{C}$	-	1.7	-	V	
Peak Output/Output Short Circuit Current	$I_{pk}/I_{OS}$	$T_J = +25^{\circ}\text{C}$	-	140	-	mA	
Average Temperature Coefficient of Output Voltage	$\Delta V_O / \Delta T$	$I_O = 5\text{mA}$	-	-0.75	-	$\text{mV}/^{\circ}\text{C}$	

Note 1. The maximum steady state usable output current and input voltage are very dependent on the heat sinking and/or lead length of the package. The data above represents pulse test conditions with junction temperatures as indicated at the initiation of the tests.

Note 2. Power Dissipation  $\leq 0.75\text{W}$ .

