

## NTE957 Integrated Circuit 3-Terminal Adjustable Negative Voltage Regulator

**Description:**

The NTE957 is an adjustable 3-terminal negative voltage regulator in a TO220 type package capable of supplying in excess of -1.5A over a -1.2V to -37V output range. The circuit design has been optimized for excellent regulation and low thermal transients. Further, the NTE957 features internal current limiting, thermal shutdown, and safe-area compensation, making this device virtually blowout-proof against overloads.

The NTE957 serves a wide variety of applications including local on-card regulation, programmable-output voltage regulation or precision current regulation. The NTE957 is the ideal complement to the NTE956 adjustable positive regulator.

**Features:**

- Output Voltage Adjustable from -1.2V to -37V
- Guaranteed 1.5A Output Current
- Line Regulation Typically 0.01%/V
- Load Regulation Typically 0.3%
- Excellent Thermal Regulation: 0.002%/W
- 77dB Ripple Rejection
- Temperature-Independent Current Limit
- Internal Thermal Overload Protection
- 100% Electrical Burn-In
- Eliminates the Need to Stock Many Voltages

**Absolute Maximum Ratings:**

Power Dissipation, P <sub>D</sub> .....	Internally Limited
Input-Output Voltage Differential, V <sub>I</sub> -V <sub>O</sub> .....	40V
Operating Junction Temperature Range, T <sub>J</sub> .....	0° to +125°C
Storage Temperature Range, T <sub>stg</sub> .....	-65° to +150°C
Typical Thermal Resistance, Junction-to-Case, R <sub>thJC</sub> .....	4°C/W
Lead Temperature (During Soldering, 10sec), T <sub>L</sub> .....	+300°C

**Electrical Characteristics:** ( $0^\circ \leq T_J \leq +125^\circ\text{C}$ ,  $V_{IN}-V_{OUT} = 5\text{V}$ ,  $I_O = 500\text{mA}$ ,  $I_{MAX} = 1.5\text{A}$ , Note 1 unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
Line Regulation	Reg <sub>line</sub>	$T_A = +25^\circ\text{C}$ , $3\text{V} \leq (V_{IN}-V_{OUT}) \leq 40\text{V}$ , Note 2	–	0.01	0.04	%/V	
		$3\text{V} \leq (V_{IN}-V_{OUT}) \leq 40\text{V}$	–	0.02	0.07	%/V	
Load Regulation	Reg <sub>load</sub>	$T_A = +25^\circ\text{C}$ , $10\text{mA} \leq I_O \leq I_{MAX}$ , Note 2	$V_{OUT} \leq 5\text{V}$	–	15	50	mV
			$V_{OUT} \geq 5\text{V}$	–	0.3	1.0	%
		$10\text{mA} \leq I_O \leq 1_{MAX}$ , Note 2	$V_{OUT} \leq 5\text{V}$	–	20	70	mV
			$V_{OUT} \geq 5\text{V}$	–	0.3	1.5	%
Thermal Regulation		$T_A = +25^\circ\text{C}$ , 20ms Pulse	–	0.003	0.04	%/W	
Adjustment Pin Current	$I_{Adj}$		–	65	100	$\mu\text{A}$	
Adjustment Pin Current Change	$\Delta I_{Adj}$	$10\text{mA} \leq I_L \leq I_{MAX}$ , $2.5\text{V} \leq (V_{IN}-V_{OUT}) \leq 40\text{V}$ , $T_A = +25^\circ\text{C}$	–	2	5	$\mu\text{A}$	
Reference Voltage	$V_{ref}$	$T_A = +25^\circ\text{C}$	–1.213	–1.250	–1.287	V	
		$3\text{V} \leq (V_{IN}-V_{OUT}) \leq 40\text{V}$ , $10\text{mA} \leq I_O \leq 1_{MAX}$ , $P \leq P_{MAX}$	–1.200	–1.250	–1.300	V	
Temperature Stability	$T_S$	$0^\circ \leq T_J \leq +125^\circ\text{C}$	–	0.6	–	%	
Minimum Load Current	$I_{Lmin}$	$(V_{IN}-V_{OUT}) \leq 40\text{V}$	–	2.5	10	mA	
		$(V_{IN}-V_{OUT}) \leq 10\text{V}$	–	1.5	6.0	mA	
Maximum Output Current Limit	$I_{max}$	$V_{IN}-V_{OUT} \leq 15\text{V}$	1.5	2.2	–	A	
		$V_{IN}-V_{OUT} = 40\text{V}$	–	0.4	–	A	
RMS Output Noise, % of $V_{OUT}$	N	$T_A = +25^\circ\text{C}$ , $10\text{Hz} \leq f \leq 10\text{kHz}$	–	0.003	–	%	
Ripple Rejection Ratio	RR	$V_{OUT} = 10\text{V}$ , $f = 120\text{Hz}$		–	60	–	dB
			$C_{ADJ} = 10\mu\text{F}$	66	77	–	dB
Long Term Stability	S	$T_A = +125^\circ\text{C}$ , 1000 Hours	–	0.3	1.0	%	

Note 1. Although power dissipation is internally limited, these specifications are applicable for power dissipations of 20W.

Note 2. Regulation is measured at constant junction temperature, using pulse testing with a low duty cycle. Changes in output voltage due to heating effects are covered under the specification for thermal regulation.

