

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_D	Internally Limited
Input-Output Voltage Differential, $V_I - V_O$	$40V$
Operating Junction Temperature Range, T_J	0° to $+125^\circ C$
Storage Temperature Range, T_{stg}	-65° to $+150^\circ C$
Typical Thermal Resistance, Junction-to-Case, R_{thJC}	$4^\circ C/W$
Lead Temperature (During Soldering, 10sec), T_L	$+300^\circ C$

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Line Regulation	Reg_{line}	$T_A = +25^{\circ}\text{C}$, $3\text{V} \leq (V_{\text{IN}} - V_{\text{OUT}}) \leq 40\text{V}$, Note 2	–	0.01	0.04	%/V
		$3\text{V} \leq (V_{\text{IN}} - V_{\text{OUT}}) \leq 40\text{V}$	–	0.02	0.07	%/V
Load Regulation	Reg_{load}	$T_A = +25^{\circ}\text{C}$, $10\text{mA} \leq I_O \leq I_{\text{MAX}}$, Note 2	$V_{\text{OUT}} \leq 5\text{V}$	–	15	mV
			$V_{\text{OUT}} \geq 5\text{V}$	–	0.3	%
		$10\text{mA} \leq I_O \leq 1_{\text{MAX}}$, Note 2	$V_{\text{OUT}} \leq 5\text{V}$	–	20	mV
			$V_{\text{OUT}} \geq 5\text{V}$	–	0.3	%
Thermal Regulation		$T_A = +25^{\circ}\text{C}$, 20ms Pulse	–	0.003	0.04	%/W
Adjustment Pin Current	I_{Adj}		–	65	100	μA
Adjustment Pin Current Change	ΔI_{Adj}	$10\text{mA} \leq I_L \leq I_{\text{MAX}}$, $2.5\text{V} \leq (V_{\text{IN}} - V_{\text{OUT}}) \leq 40\text{V}$, $T_A = +25^{\circ}\text{C}$	–	2	5	μA
Reference Voltage	V_{ref}	$T_A = +25^{\circ}\text{C}$	–1.213	–1.250	–1.287	V
		$3\text{V} \leq (V_{\text{IN}} - V_{\text{OUT}}) \leq 40\text{V}$, $10\text{mA} \leq I_O \leq 1_{\text{MAX}}$, $P \leq P_{\text{MAX}}$	–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}	$(V_{\text{IN}} - V_{\text{OUT}}) \leq 40\text{V}$	–	2.5	10	mA
		$(V_{\text{IN}} - V_{\text{OUT}}) \leq 10\text{V}$	–	1.5	6.0	mA
Maximum Output Current Limit	I_{max}	$V_{\text{IN}} - V_{\text{OUT}} \leq 15\text{V}$	1.5	2.2	–	A
		$V_{\text{IN}} - V_{\text{OUT}} = 40\text{V}$	–	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	$V_{\text{OUT}} = 10\text{V}$, $f = 120\text{Hz}$	–	60	–	dB
		$C_{\text{ADJ}} = 10\mu\text{F}$	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.

