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NTE999 Integrated Circuit Adjustable Precision Shunt Regulator

Description:

The NTE999 is a three-terminal adjustable shunt regulator with guaranteed thermal stability over a temperature range of -0° to $+70^{\circ}\text{C}$. The output voltage may be set to any value between V_{ref} (approximately 2.5V) and 36V with two external resistors. This device has a typical dynamic output impedance of 0.2Ω . Active output circuitry provides a very sharp turn-on characteristic, making the NTE999 an excellent replacement for zener diodes in many applications.

Features:

- Equivalent Full-Range Temperature Coefficient: $30\text{ppm}/^{\circ}\text{C}$ Typ
- Adjustable Output Voltage
- Fast Turn-On Response
- Sink Current Capability: 1mA to 100mA
- Low Dynamic Output Impedance: 0.2Ω Typ
- Low Output Noise Voltage

Absolute Maximum Ratings: ($T_A = 0^{\circ}$ to $+70^{\circ}\text{C}$ unless otherwise specified)

Cathode Voltage (Note 1), V_{KA}	37V
Continuous Cathode Current Range, I_K	-100mA to 150mA
Reference Input Current Range, I_{ref}	$-50\mu\text{A}$ to 10mA
Continuous Power Dissipation, P_D	
Up to $+25^{\circ}\text{C}$	775mW
Derate Above $+25^{\circ}\text{C}$	$6.2\text{mW}/^{\circ}\text{C}$
Operating Ambient Temperature Range, T_{opr}	0° to $+70^{\circ}\text{C}$
Storage Temperature Range, T_{stg}	-65° to $+150^{\circ}\text{C}$
Lead Soldering Temperature (.0625 (1.6mm) from case for 10s), T_L	260°C

Recommended Operating Conditions:

Cathode Voltage, V_{KA}	
Min	V_{ref}
Max	36V
Cathode Current (For Regulation), I_K	
Min	1mA
Max	100mA

Note 1. Voltage values are with respect to the anode terminal unless otherwise specified.



Electrical Characteristics: ($T_A = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Reference Input Voltage	V_{ref}	$V_{KA} = V_{\text{ref}}, I_K = 10\text{mA}$	2440	2495	2550	mV
Deviation of Reference Input Voltage	$V_{\text{ref(dev)}}$	$V_{KA} = V_{\text{ref}}, I_K = 10\text{mA}, T_A = 0^\circ \text{ to } +70^\circ\text{C}$	—	8	17	mV
Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage	$\frac{\Delta V_{\text{ref}}}{\Delta V_{KA}}$	$I_K = 10\text{mA}$	$\Delta V_{KA} = 10\text{V} - V_{\text{ref}}$	—	-1.4	-2.7 mV
			$\Delta V_{KA} = 36\text{V} - 10\text{V}$	—	-1.0	-2.0 V
Reference Input Current	I_{ref}	$I_K = 10\text{mA}, R_1 = 10\text{k}\Omega, R_2 = \infty$	—	2.0	4.0	μA
Deviation of Reference Input Current	$I_{\text{ref(dev)}}$	$I_K = 10\text{mA}, R_1 = 10\text{k}\Omega, R_2 = \infty, T_A = 0^\circ \text{ to } +70^\circ\text{C}$	—	0.4	1.2	μA
Minimum Cathode Current for Regulation	I_{min}	$V_{KA} = V_{\text{ref}}$	—	0.4	1.0	mA
Off-State Cathode Current	I_{off}	$V_{KA} = 36\text{V}, V_{\text{ref}} = 0$	—	0.1	1.0	μA
Dynamic Impedance	$ z_{ak} $	$V_{KA} = V_{\text{ref}}, I_K = 1\text{mA to } 100\text{mA}, f \leq 1\text{kHz}$	—	0.2	0.5	Ω

