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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°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: 30ppm/°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° to +70°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} . . . . . –50µA to 10mA
Continuous Power Dissipation, P_D
  Up to +25°C 775mW
  Derate Above +25°C . . . . . 6.2mW/°C
Operating Ambient Temperature Range, T_{opr} . . . . . 0° to +70°C
Storage Temperature Range, T_{stg} . . . . . –65° to +150°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°C unless otherwise specified)

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