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NTE309K
Integrted Circuit
Voltage Regulator

Description:

The NTE309K is a complete 5V regulator fabricated on a single silicon chip. It is designed for local regulation on digital logic cards, eliminating the distribution problems associated with single–point regulation. With the TO3 power package, the available output current is greater than 1A.

The regulator is essentially blowout proof. Current limiting is included to limit the peak output current to a safe value. In addition, the thermal shutdown is provided to keep the IC from overheating. If internal dissipation becomes too great, the regulator will shut down to prevent excessive heating.

Considerable effort was expended to make these devices easy to use and to minimize the number of external components. It is not necessary to bypass the output, although this does improve transient response somewhat. Input bypassing is needed, however, if the regulator is located very far from the filter capacitor of the power supply. Stability is also achieved by methods that provide very good rejection of load or line transients as are usually seen with TTL logic.

Although designed primarily as a fixed–voltage regulator, the output can be set to voltages above 5V, as shown below. It is also possible to use the circuits as the control element in precision regulators, taking advantage of the good current–handling capability and the thermal overload protection.

Features:

- Specified to be compatible, worst case, with TTL and DTL
- Output current in excess of 1A
- Internal thermal overload protection
- No external components required

Absolute Maximum Ratings:

Input Voltage, V_{IN} 35V
Power Dissipation, P_D . . . . . Internally Limited
Operating Junction Temperature Range, T_{opr} . . . . . 0°C to +125°C
Storage Temperature Range, T_{stg} . . . . . –65°C to +150°C
Typical Thermal Resistance, Junction–to–Case (Note 1), R_{thJC} . . . . . 2.5°C/W
Lead Temperature (Soldering, 10 seconds), T_L . . . . . +300°C

Note 1. Without a heat sink, the thermal resistance of the TO–3 package is approximately 35°C/W. With a heat sink,

Electrical Characteristics: (Note 2)

Parameter	Test Conditions	Min	Typ	Max	Unit
Output Voltage	T_J = +25°C	4.8	5.05	5.2	V
Line Regulation	T_J = +25°C, 7 ≤ V_{IN} ≤ 25V	–	4.0	50	mV
Load Regulation	T_J = +25°C 5mA ≤ I_{OUT} ≤ 1.5A	–	15	100	mV
Output Voltage	7 ≤ V_{IN} ≤ 25V, 5mA ≤ I_{OUT} ≤ I_{MAX}, P ≤ P_{MAX}	4.75	–	5.25	V
Quiescent Current	7V ≤ V_{In} ≤ 25V	–	5.2	10	mA
Quiescent Current Change	7V ≤ V_{IN} ≤ 25V	–	–	0.5	mA
	5mA ≤ I_{OUT} ≤ I_{MAX}	–	–	0.8	mA
Output Noise Voltage	T_A = +25°C 10Hz ≤ f ≤ 100kHz	–	40	–	µV
Long Term Stability		–	–	20	mV
Ripple Rejection	T_J = +25°C	50	–	–	dB

Note 2. Unless otherwise specified, these specifications apply 0°C ≤ T_J ≤ +125°C V_{IN} = 10V; and I_{OUT} = 0.5A. I_{MAX} = 1.0A and P_{MAX} = 20W.

Pin Connection Diagram



