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NTE944 & NTE944M
Integrated Circuit
Programmable Operational Amplifier

Description:

The NTE944 (8–Lead Metal Can) and NTE944M (8–Lead MiniDIP) are extremely versatile programmable monolithic operational amplifiers. A single external master bias current setting resistor programs the input bias current, input offset current, quiescent power consumption, slew rate, input noise, and the gain–bandwidth product. These devices are truly general purpose operational amplifiers.

Features:

- ±1V to ±18V power supply operation
- 3nA input offset current
- Standby power consumption as low as 500mW
- No frequency compensation required
- Programmable electrical characteristics
- Offset voltage nulling capability
- Can be powered by two flashlight batteries
- Short circuit protection

Absolute Maximum Ratings:

Supply Voltage . . . . ±18V
Power Dissipation (Note 1) 500mW
Differential Input Voltage . . . . ±30V
Input Voltage (Note 2) . . . . ±15V
I_{SET} Current 150µA
Output Short Circuit Duration . . . . Indefinite
Operating Temperature Range . . . . 0° ≤ T_A ≤ +70°C
Storage Temperature Range . . . . –65° to +150°C
Lead Temperature (Soldering, 10sec) . . . . +300°C

Note 1. The maximum junction temperature of the NTE944 is 100°C. For operating at elevated temperatures, the NTE944 must be derated based on a thermal resistance of 150°C/W junction to ambient, or 45°C/W junction to case. The thermal resistance of the NTE944M is +125°C/W.

Note 2. For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.

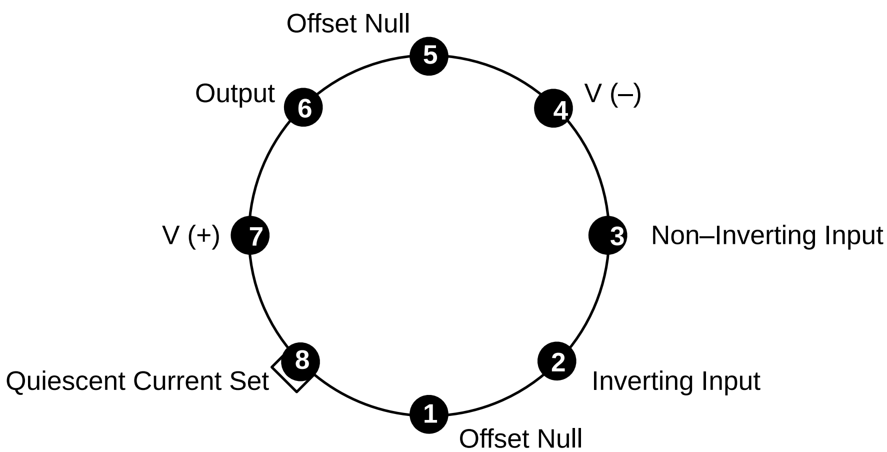
Electrical Characteristics: (0° ≤ T_A ≤+70°C, unless otherwise specified)

Parameter	Test Conditions		I_{SET} = 1µA Min	I_{SET} = 1µA Max	I_{SET} = 10µA Min	I_{SET} = 10µA Max	Unit
V_{OS}	V_S = ±1.5V	T_A = +25°C, R_S ≤ 100kΩ	–	5	–	6	mV
	V_S = ±15V		–	5	–	6	mV
	V_S = ±1.5V	R_S ≤ 10kΩ	–	6.5	–	7.5	mV
	V_S = ±15V		–	6.5	–	7.5	mV
I_{OS}	V_S = ±1.5V	T_A = +25°C	–	6	–	20	nA
	V_S = ±15V		–	6	–	20	nA
	V_S = ±1.5V		–	8	–	25	nA
	V_S = ±15V		–	8	–	25	nA
I_{bias}	V_S = ±1.5V	T_A = +25°C	–	10	–	75	nA
	V_S = ±15V		–	10	–	75	nA
	V_S = ±1.5V		–	10	–	80	nA
	V_S = ±15V		–	10	–	80	nA
Large Signal Voltage Gain	V_S = ±1.5V	T_A = +25°C, R_L ≤ 100kΩ	25k	–	–	–	
		V_O = ±0.6V, R_L ≤ 10kΩ	–	–	25k	–	
	V_S = ±15V	T_A = +25°C, R_L ≤ 100kΩ	60k	–	–	–	
		V_O = ±10V, R_L ≤ 10kΩ	–	–	60k	–	
	V_S = ±1.5V	V_O = ±0.5V, R_L = 100kΩ	25k	–	–	–	
		R_L = 10kΩ	–	–	25k	–	
	V_S = ±15V	V_O = ±10V, R_L = 100kΩ	50k	–	–	–	
		R_L = 10kΩ	–	–	50k	–	
Supply Current	V_S = ±1.5V	T_A = +25°C	–	8	–	90	µA
	V_S = ±15V		–	11	–	100	µA
	V_S = ±1.5V		–	8	–	90	µA
	V_S = ±15V		–	11	–	100	µA
Power Consumption	V_S = ±1.5V	T_A = +25°C	–	24	–	270	µW
	V_S = ±15V		–	330	–	3k	µW
	V_S = ±1.5V		–	24	–	270	µW
	V_S = ±15V		–	330	–	3k	µW
Output Voltage Swing	V_S = ±1.5V	R_L = 100kΩ	±0.6	–	–	–	V
		R_L = 10kΩ	–	–	±0.6	–	V
	V_S = ±15V	R_L = 100kΩ	±12	–	–	–	V
		R_L = 10kΩ	–	–	±12	–	V
Common Mode Rejection Ratio	V_S = ±1.5V	R_S ≤ 10kΩ	70	–	70	–	dB
	V_S = ±15V		70	–	70	–	dB
Supply Voltage Rejection Ratio	V_S = ±1.5V	R_S ≤ 10kΩ	74	–	74	–	dB
	V_S = ±15V		74	–	74	–	dB

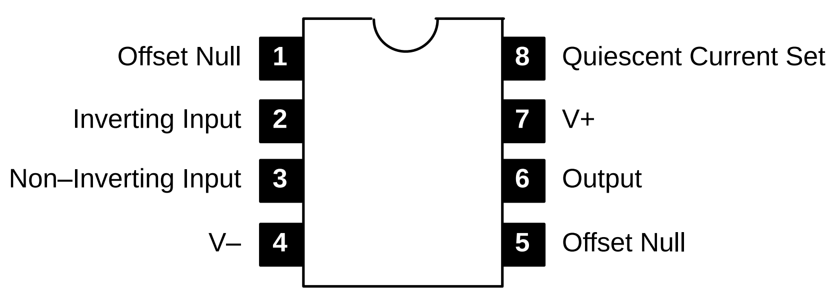
Resistor Biasing: (Set Current Setting Resistor to V–)

	I_{SET}				
V_S	0.1μA	0.5μA	1.0μA	5μA	10μA
±1.5V	25.6MΩ	5.04MΩ	2.5MΩ	492.0kΩ	244.0kΩ
±3.0V	55.6MΩ	11.0MΩ	5.5MΩ	1.09MΩ	544.0kΩ
±6.0V	116.0MΩ	23.0MΩ	11.5MΩ	2.29MΩ	1.14MΩ
±9.0V	176.0MΩ	35.0MΩ	17.5MΩ	3.49MΩ	1.74MΩ
±12.0V	236.0MΩ	47.0MΩ	23.5MΩ	4.69MΩ	2.34MΩ
±15.0V	296.0MΩ	59.0MΩ	29.5MΩ	5.89MΩ	2.94MΩ

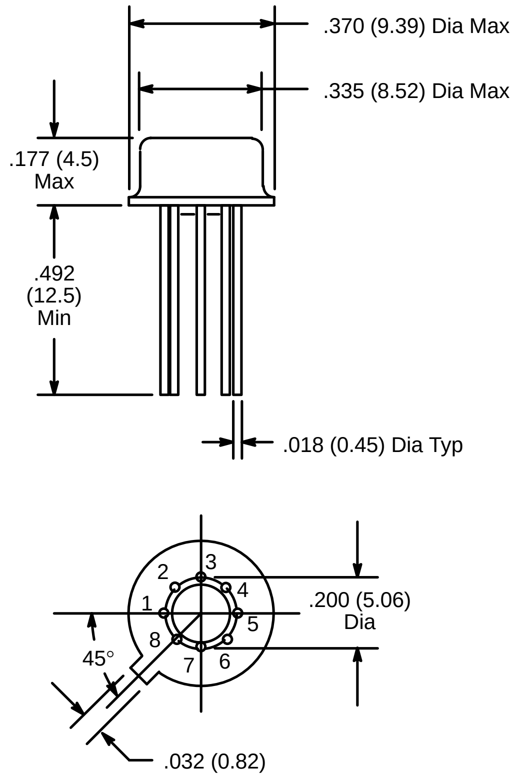
Pin Connection Diagram
NTE944
(Top View)



Pin Connection Diagram
NTE944M



Dimensional Drawing
NTE944



Dimensional Drawing
NTE944M