



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:

- $\pm 1\text{V}$ to $\pm 18\text{V}$ 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	$\pm 18\text{V}$
Power Dissipation (Note 1)	500mW
Differential Input Voltage	$\pm 30\text{V}$
Input Voltage (Note 2)	$\pm 15\text{V}$
I_{SET} Current	$150\mu\text{A}$
Output Short Circuit Duration	Indefinite
Operating Temperature Range	$0^\circ \leq T_A \leq +70^\circ\text{C}$
Storage Temperature Range	-65° to $+150^\circ\text{C}$
Lead Temperature (Soldering, 10sec)	$+300^\circ\text{C}$

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 $+125^\circ\text{C/W}$.

Note 2. For supply voltages less than $\pm 15\text{V}$, the absolute maximum input voltage is equal to the supply voltage.

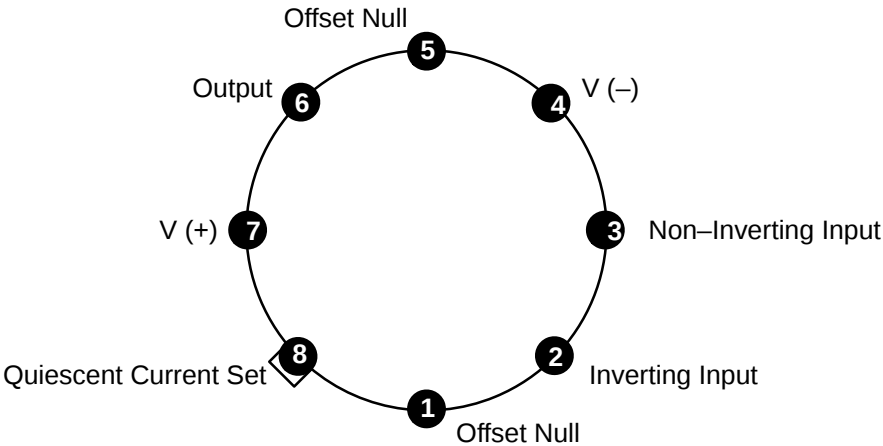
Electrical Characteristics: ($0^{\circ} \leq T_A \leq +70^{\circ}\text{C}$, unless otherwise specified)

Parameter	Test Conditions		I _{SET} = 1μA		I _{SET} = 10μA		Unit
			Min	Max	Min	Max	
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

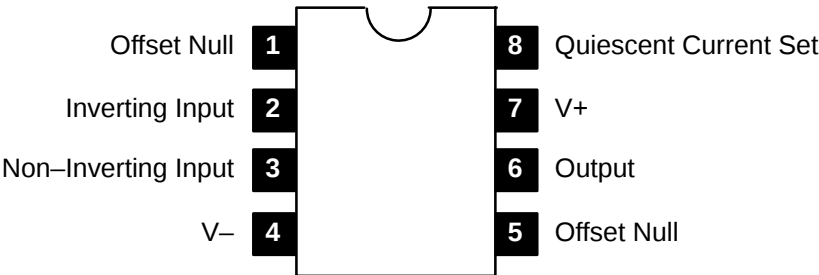
Resistor Biasing: (Set Current Setting Resistor to V–)

I_{SET}					
V_S	0.1 μ A	0.5 μ A	1.0 μ A	5 μ A	10 μ A
$\pm 1.5V$	25.6M Ω	5.04M Ω	2.5M Ω	492.0k Ω	244.0k Ω
$\pm 3.0V$	55.6M Ω	11.0M Ω	5.5M Ω	1.09M Ω	544.0k Ω
$\pm 6.0V$	116.0M Ω	23.0M Ω	11.5M Ω	2.29M Ω	1.14M Ω
$\pm 9.0V$	176.0M Ω	35.0M Ω	17.5M Ω	3.49M Ω	1.74M Ω
$\pm 12.0V$	236.0M Ω	47.0M Ω	23.5M Ω	4.69M Ω	2.34M Ω
$\pm 15.0V$	296.0M Ω	59.0M Ω	29.5M Ω	5.89M Ω	2.94M Ω

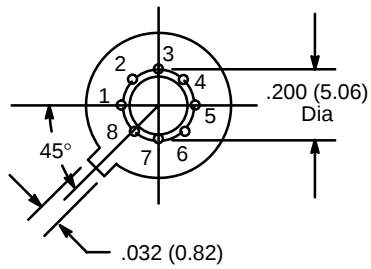
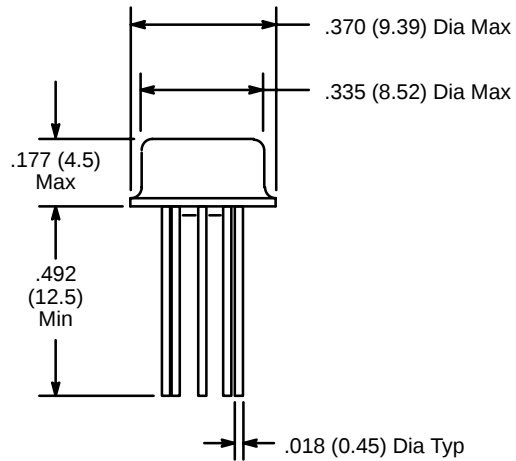
Pin Connection Diagram
NTE944
(Top View)



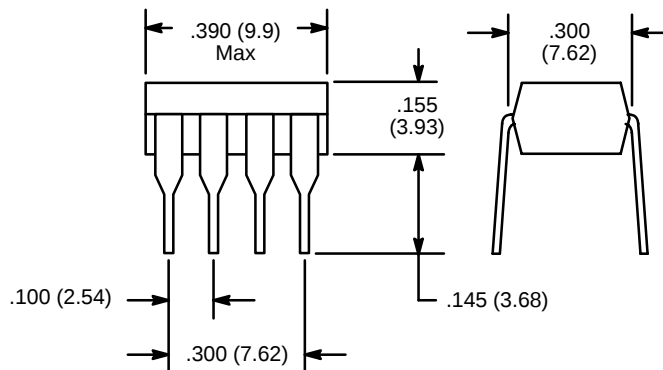
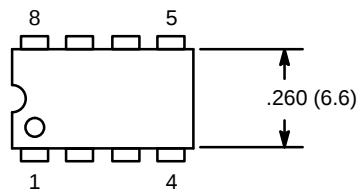
Pin Connection Diagram
NTE944M



Dimensional Drawing NTE944



Dimensional Drawing NTE944M



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