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## NTE903 Integrated Circuit Operational Amplifier

**Description:**

The NTE903 is an operational amplifier in a 12-Lead TO5 type metal can having all the desirable features and characteristics of its prototypes plus a lower noise figure and improved characteristics for offset voltage, offset current, bias current, and impedance.

**Typical Applications:**

- Narrow-Band and Band-Pass Amplifier
- Operational Functions
- Feedback Amplifier
- DC and Video Amplifier
- Multivibrator
- Oscillator
- Comparator
- Servo Driver
- Scaling Adder
- Balanced Modulator-Driver

**Absolute Maximum Ratings:** ( $T_A = +25^\circ\text{C}$  unless otherwise specified)

Maximum Signal Voltage ..... -8V to +1V  
 Maximum Device Dissipation ..... 600mW  
 Operating Temperature Range,  $T_{opr}$  .....  $-55^\circ$  to  $+125^\circ\text{C}$   
 Storage Temperature Range,  $T_{stg}$  .....  $-65^\circ$  to  $+200^\circ\text{C}$   
 Lead Temperature (During Soldering, 1/16" from case, 10sec max.),  $T_L$  .....  $+265^\circ\text{C}$

**Electrical Characteristics:** ( $T_A = +25^\circ\text{C}$ ,  $V_{CC} = \pm 12\text{V}$ , Note 1 unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Input Offset Voltage	$V_{IO}$		-	1	2	mV
Input Offset Current	$I_{IO}$		-	0.5	1.6	$\mu\text{A}$
Input Bias Current	$I_{IB}$		-	4.7	6.0	$\mu\text{A}$
Input Offset Voltage Sensitivity, Positive			-	0.096	0.5	mV/V
Input Offset Voltage Sensitivity, Negative			-	0.156	0.5	mV/V
Device Dissipation	$P_D$		-	175	-	mW
		Pin8 shorted to Pin12	-	500	-	mW

Note 1. Pin5 not connected unless otherwise specified

**Electrical Characteristics:** ( $T_A = +25^\circ\text{C}$ ,  $V_{CC} = \pm 12\text{V}$ , Note 1 unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Dynamic Characteristics</b> (All tests at $f = 1\text{kHz}$ except $BW_{OL}$ )						
Open-Loop Differential Voltage Gain	$A_{OL}$		66	70	–	dB
Open-Loop Bandwidth	$BW_{OL}$	–3dB Point	200	320	–	kHz
Slew Rate	SR	$R_S = 1\text{k}\Omega$	–	7	–	$\text{V}/\mu\text{s}$
Common-Mode Rejection Ratio	CMRR		80	103	–	dB
Maximum Output-Voltage Swing	$V_{O(P-P)}$		12	14	–	$V_{P-P}$
Input Impedance	$Z_{IN}$		7.5	10	–	$\text{k}\Omega$
Output Impedance	$Z_{OUT}$		–	85	–	$\Omega$
Common-Mode Input-Voltage Range	$V_{ICR}$		+0.65 to –8			V
Noise Figure	NF	$V_{CC} = \pm 3\text{V}$ , $R_S = 1\text{k}\Omega$	–	6.3	9.0	dB
		$V_{CC} = \pm 6\text{V}$ , $R_S = 1\text{k}\Omega$	–	8.3	12	dB
		$V_{CC} = \pm 9\text{V}$ , $R_S = 1\text{k}\Omega$	–	10	14	dB
		$V_{CC} = \pm 12\text{V}$ , $R_S = 1\text{k}\Omega$	–	11	16	dB

Note 1. Pin5 not connected unless otherwise specified

