

## NTE870 Integrated Circuit Dual Operational Transconductance Amp

### **Description:**

The NTE870 consists of two current controlled transconductance amplifiers each with differential inputs and a push-pull output. The two amplifiers share common supplies but otherwise operate independently. Linearizing diodes are provided at the inputs to reduce distortion and allow higher input levels resulting in a 10dB signal-to-noise improvement referenced to 0.5 percent THD. Controlled impedance buffers are provided which are especially designed to complement the dynamic range of the amplifiers.

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

Supply Voltage, $V_+/V_-$	36V or $\pm 18\text{V}$
Differential Input Voltage, $V_{ID}$	$\pm 5\text{V}$
Diode Bias Current, $I_D$	2mA
Amp Bias Current, $I_{ABC}$	2mA
Buffer Output Current, $I_O$	20mA
Power Dissipation, $P_D$	570mW
DC Input Voltage, $V_{IN}$	$V_+$ to $V_-$
Operating Temperature Range, $T_{opr}$	$-20^\circ$ to $+75^\circ\text{C}$
Storage Temperature Range, $T_{stg}$	$-40^\circ$ to $+125^\circ\text{C}$

### **Electrical Characteristics:** ( $T_A = +25^\circ\text{C}$ , $V_+/V_- = \pm 15\text{V}$ , $I_{ABC} = 500\mu\text{A}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Offset Voltage ( $V_{OS}$ )	$V_{IO}$		–	0.4	5.0	mV
Input Offset Voltage		$I_{ABC} = 5\mu\text{A}$	–	0.3	5.0	mV
$V_{OS}$ Including Diodes		Diode Base Current, $I_D = 500\mu\text{A}$	–	0.5	5.0	mV
Input Offset Change		$5\mu\text{A} \leq I_{ABC} \leq 500\mu\text{A}$	–	0.1	–	mV
Input Bias Current	$I_B$		–	0.4	5.0	$\mu\text{A}$
		$T_A = -20^\circ$ to $+75^\circ\text{C}$	–	1.0	8.0	$\mu\text{A}$

**Electrical Characteristics (Cont'd):** ( $T_A = +25^{\circ}\text{C}$ ,  $V_+/V_- = \pm 15\text{V}$ ,  $I_{ABC} = 500\mu\text{A}$ )

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Forward Transconductance (gm)	gm		6700	9600	13000	$\mu\text{mhos}$
		$T_A = -20^{\circ}$ to $+75^{\circ}\text{C}$	5400	–	–	$\mu\text{mhos}$
gm Tracking		$R_L = 0$ , $I_{ABC} = 5\mu\text{A}$	–	0.3	–	dB
Peak Output Current	$I_{OP}$	$R_L = 0$ , $I_{ABC} = 5\mu\text{A}$	–	5.0	–	$\mu\text{A}$
		$R_L = 0$ , $I_{ABC} = 500\mu\text{A}$	350	500	650	$\mu\text{A}$
		$R_L = 0$ , $T_A = -20^{\circ}$ to $+75^{\circ}\text{C}$	300	–	–	$\mu\text{A}$
Peak Output Voltage Positive	$V_{OP}$	$R_L = \infty$ , $5\mu\text{A} \leq I_{ABC} \leq 500\mu\text{A}$	+12	$\pm 14.2$	–	V
Peak Output Voltage Negative		$R_L = \infty$ , $5\mu\text{A} \leq I_{ABC} \leq 500\mu\text{A}$	–12	$-14.4$	–	V
Supply Current	$I_{CC}$	$I_{ABC} = 500\mu\text{A}$ , two circuit	–	2.6	–	mA
$V_{OS}$ Sensitivity Positive	SVR	$\Delta V_{OS}/\Delta V_+$	76.5	94.0	–	dB
$V_{OS}$ Sensitivity Negative		$\Delta V_{OS}/\Delta V_-$	76.5	94.0	–	dB
Input Offset Current	$I_{IO}$		–	0.1	0.6	$\mu\text{A}$
CMMR	CMR		80	110	–	dB
Common Mode Range	$V_{ICM}$		$\pm 12.0$	$\pm 13.5$	–	V
Cross Talk	CT	$20\text{Hz} < f < 20\text{kHz}$ , Note 2	–	–100	100	dB
Differential Input Current	$I_{ID}$	$I_{ABC} = 0$ , Input = $\pm 4\text{V}$	–	0.02	100	nA
Leakage Current	$I_{LEAK}$	$I_{ABC} = 0$	–	0.2	0	nA
Input Resistance	$R_{IN}$		10	26	–	$\text{k}\Omega$
Open Loop Bandwidth			–	2	–	MHz
Slew Rate	SR		–	50	–	$\text{V}/\mu\text{s}$
Buffer Input Current		Note 2	–	0.4	5.0	$\mu\text{A}$
Peak Buffer Output Voltage		Note 2	10	–	–	V

Note 1. Open unless otherwise specified. The inputs to the buffers are grounded and the outputs are open.

Note 2.  $R_{OUT} = 5\text{k}\Omega$  connected from the buffer output to  $V_-$  and the input buffer is connected to the transconductance amplifier output.  $I_{ABC} = 500\mu\text{A}$ .

## Pin Connection Diagram

