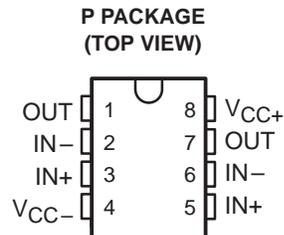


# NE5532, NE5532A, NE5532I, NE5532AI DUAL LOW-NOISE OPERATIONAL AMPLIFIERS

SLOS075A – NOVEMBER 1979 – REVISED SEPTEMBER 1990

- **Equivalent Input Noise Voltage**  
5  $\text{nv}/\sqrt{\text{Hz}}$  Typ at 1 kHz
- **Unity-Gain Bandwidth . . . 10 MHz Typ**
- **Common-Mode Rejection Ratio**  
100 dB Typ
- **High DC Voltage Gain . . . 100 V/mV Typ**
- **Peak-to-Peak Output Voltage Swing**  
32 V Typ With  $V_{CC\pm} = \pm 18 \text{ V}$  and  
 $R_L = 600 \Omega$
- **High Slew Rate . . . 9 V/ $\mu\text{s}$  Typ**
- **Wide Supply Voltage Range . . .  $\pm 3 \text{ V}$   
to  $\pm 20 \text{ V}$**
- **Designed to Be Interchangeable With**  
Signetics NE5532 and NE5532A

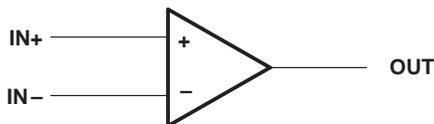


## description

The NE5532 and NE5532A are monolithic high-performance operational amplifiers combining excellent dc and ac characteristics. They feature very low noise, high output drive capability, high unity-gain and maximum-output-swing bandwidths, low distortion, high slew rate, input-protection diodes, and output short-circuit protection. These operational amplifiers are internally compensated for unity-gain operation. The NE5532A has specified maximum limits for equivalent input noise voltage.

The NE5532 and NE5532A are characterized for operation from 0°C to 70°C. The NE5532I and NE5532AI are characterized for operation from -40°C to 85°C.

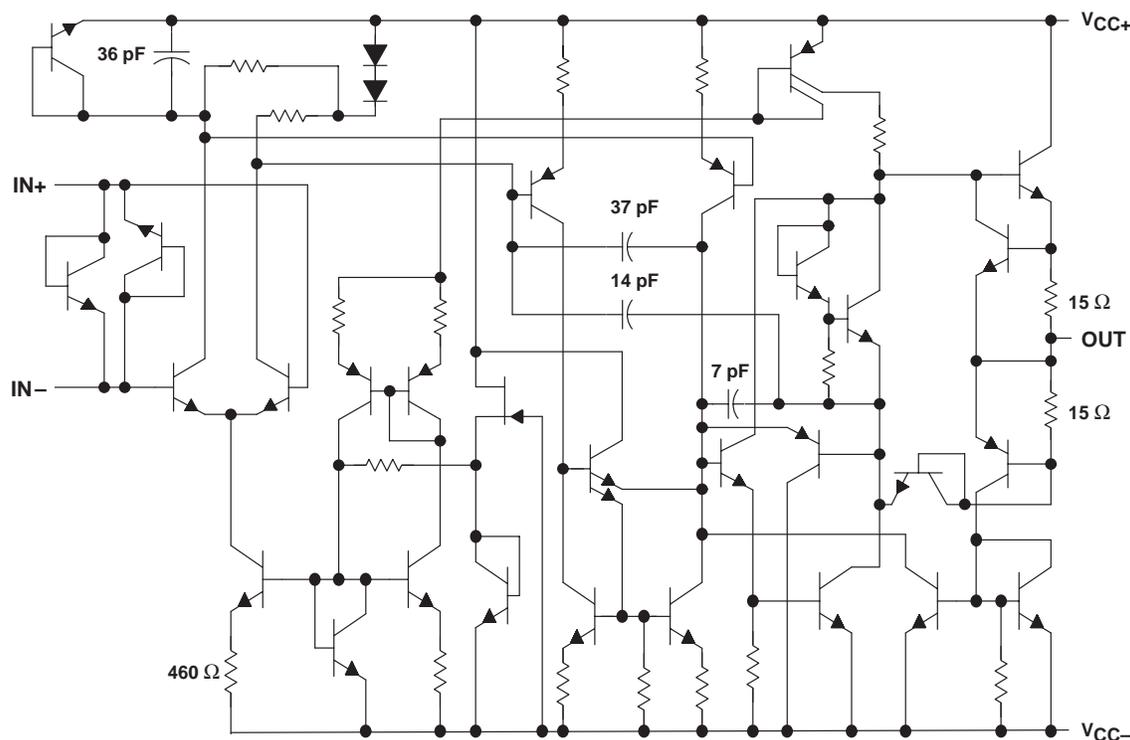
## symbol (each amplifier)



# NE5532, NE5532A, NE5532I, NE5532AI DUAL LOW-NOISE OPERATIONAL AMPLIFIERS

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## schematic (each amplifier)



Component values shown are nominal.

## absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, $V_{CC+}$ (see Note 1)	22 V
Supply voltage, $V_{CC-}$ (see Note 1)	-22 V
Input voltage, either input (see Notes 1 and 2)	$V_{CC\pm}$
Input current (see Note 3)	$\pm 10$ mA
Duration of output short circuit (see Note 4)	unlimited
Continuous total power dissipation	See Dissipation Rating Table
Operating free-air temperature range: NE5532, NE5532A	0°C to 70°C
NE5532I, NE5532AI	-40°C to 85°C
Storage temperature range	-65°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds	260°C

- NOTES:
- All voltage values, except differential voltages, are with respect to the midpoint between  $V_{CC+}$  and  $V_{CC-}$ .
  - The magnitude of the input voltage must never exceed the magnitude of the supply voltage.
  - Excessive input current will flow if a differential input voltage in excess of approximately 0.6 V is applied between the inputs unless some limiting resistance is used.
  - The output may be shorted to ground or either power supply. Temperature and/or supply voltages must be limited to ensure the maximum dissipation rating is not exceeded.

DISSIPATION RATING TABLE

PACKAGE	$T_A \leq 25^\circ\text{C}$ POWER RATING	OPERATING FACTOR ABOVE $T_A = 25^\circ\text{C}$	$T_A = 70^\circ\text{C}$ POWER RATING	$T_A = 85^\circ\text{C}$ POWER RATING
P	1000 mW	8 mW/°C	640 mW	520 mW



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# NE5532, NE5532A, NE5532I, NE5532AI DUAL LOW-NOISE OPERATIONAL AMPLIFIERS

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## recommended operating conditions

	MIN	NOM	MAX	UNIT
Supply voltage, $V_{CC+}$	5		15	V
Supply voltage, $V_{CC-}$	-5		-15	V

## electrical characteristics, $V_{CC\pm} = +15\text{ V}$ , $T_A = 25^\circ\text{C}$ (unless otherwise noted)

PARAMETER		TEST CONDITIONS†		MIN	TYP	MAX	UNIT
$V_{IO}$	Input offset voltage	$V_O = 0$	$T_A = 25^\circ\text{C}$	0.5	4		mV
			$T_A = \text{Full range}$			5	
$I_{IO}$	Input offset current	$T_A = 25^\circ\text{C}$		10	150		nA
		$T_A = \text{Full range}$				200	
$I_{IB}$	Input bias current	$T_A = 25^\circ\text{C}$		200	800		nA
		$T_A = \text{Full range}$				1000	
$V_{ICR}$	Common-mode input voltage range			$\pm 12$	$\pm 13$		V
$V_{OPP}$	Maximum peak-to-peak output voltage swing	$R_L \geq 600\ \Omega$	$V_{CC\pm} = \pm 15\text{ V}$	24	26		V
			$V_{CC\pm} = \pm 18\text{ V}$	30	32		
$A_{VD}$	Large-signal differential voltage amplification	$R_L \geq 600\ \Omega$ , $V_O = \pm 10\text{ V}$	$T_A = 25^\circ\text{C}$	15	50		V/mV
			$T_A = \text{Full range}$	10			
		$R_L \geq 2\text{ k}\Omega$ , $V_O = \pm 10\text{ V}$	$T_A = 25^\circ\text{C}$	25	100		
			$T_A = \text{Full range}$	15			
$A_{vd}$	Small-signal differential voltage amplification	$f = 10\text{ kHz}$		2.2		V/mV	
$B_{OM}$	Maximum-output-swing bandwidth	$R_L = 600\ \Omega$	$V_O = \pm 10\text{ V}$	140			kHz
			$V_{CC\pm} = \pm 18\text{ V}$ , $V_O = \pm 14\text{ V}$	100			
$B_1$	Unity-gain bandwidth	$R_L = 600\ \Omega$ ,	$C_L = 100\text{ pF}$	10			MHz
$r_i$	Input resistance			30	300		k $\Omega$
$z_o$	Output impedance	$A_{VD} = 30\text{ dB}$ , $R_L = 600\ \Omega$ , $f = 10\text{ kHz}$		0.3			$\Omega$
CMRR	Common-mode rejection ratio	$V_{IC} = V_{ICR\text{ min}}$		70	100		dB
$k_{SVR}$	Supply voltage rejection ratio ( $\Delta V_{CC\pm}/\Delta V_{IO}$ )	$V_{CC\pm} = \pm 9\text{ V to } \pm 15\text{ V}$ , $V_O = 0$		80	100		dB
$I_{OS}$	Output short-circuit current			38			mA
$I_{CC}$	Total supply current	$V_O = 0$ , No load		8	16		mA
		Crosstalk attenuation ( $V_{O1}/V_{O2}$ )		$V_{O1} = 10\text{ V peak}$ , $f = 1\text{ kHz}$		110	

† All characteristics are measured under open-loop conditions with zero common-mode input voltage unless otherwise specified. Full range for  $T_A$  is  $0^\circ\text{C}$  to  $70^\circ\text{C}$  for NE5532/NE5532A and  $-40^\circ\text{C}$  to  $85^\circ\text{C}$  for NE5532I/NE5532AI.

## operating characteristics, $V_{CC\pm} = \pm 15\text{ V}$ , $T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	NE5532/NE5532I			NE5532A/NE5532AI			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	
SR	Slew rate at unity gain	9			9			V/ $\mu\text{s}$
	Overshoot factor	$V_I = 100\text{ mV}$ , $R_L = 600\ \Omega$ ,		10%	10%			
$V_n$	Equivalent input noise voltage	$f = 30\text{ Hz}$		8	8	10	nV/ $\sqrt{\text{Hz}}$	
		$f = 1\text{ kHz}$		5	5	6		
$I_n$	Equivalent input noise current	$f = 30\text{ Hz}$		2.7	2.7		pA/ $\sqrt{\text{Hz}}$	
		$f = 1\text{ kHz}$		0.7	0.7			



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