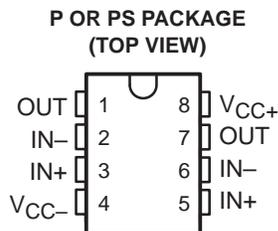


- Equivalent Input Noise Voltage  
5 nV/ $\sqrt{\text{Hz}}$  Typ at 1 kHz
- Unity-Gain Bandwidth . . . 10 MHz Typ
- Common-Mode Rejection  
Ratio . . . 100 dB Typ
- High dc Voltage Gain . . . 100 V/mV Typ
- Peak-to-Peak Output Voltage Swing  
32 V Typ With  $V_{CC\pm} = \pm 18 \text{ V}$  and  $R_L = 600 \Omega$
- 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
- Package Options Include Plastic  
Small-Outline (PS) Package and Standard  
Plastic (P) DIP



## description

The NE5532 and NE5532A are 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 compensated internally for unity-gain operation. The NE5532A has specified maximum limits for equivalent input noise voltage.

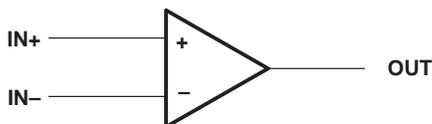
The NE5532 and NE5532A are characterized for operation from 0°C to 70°C.

### AVAILABLE OPTIONS

T <sub>A</sub>	PACKAGED DEVICES	
	PLASTIC DUAL-IN-LINE (P)	PLASTIC SMALL-OUTLINE (PS)
0°C to 70°C	NE5532P NE5532AP	NE5532PS NE5532APS

The PS package is available taped and reeled. Add the suffix R to the device type (e.g., NE5532PSR).

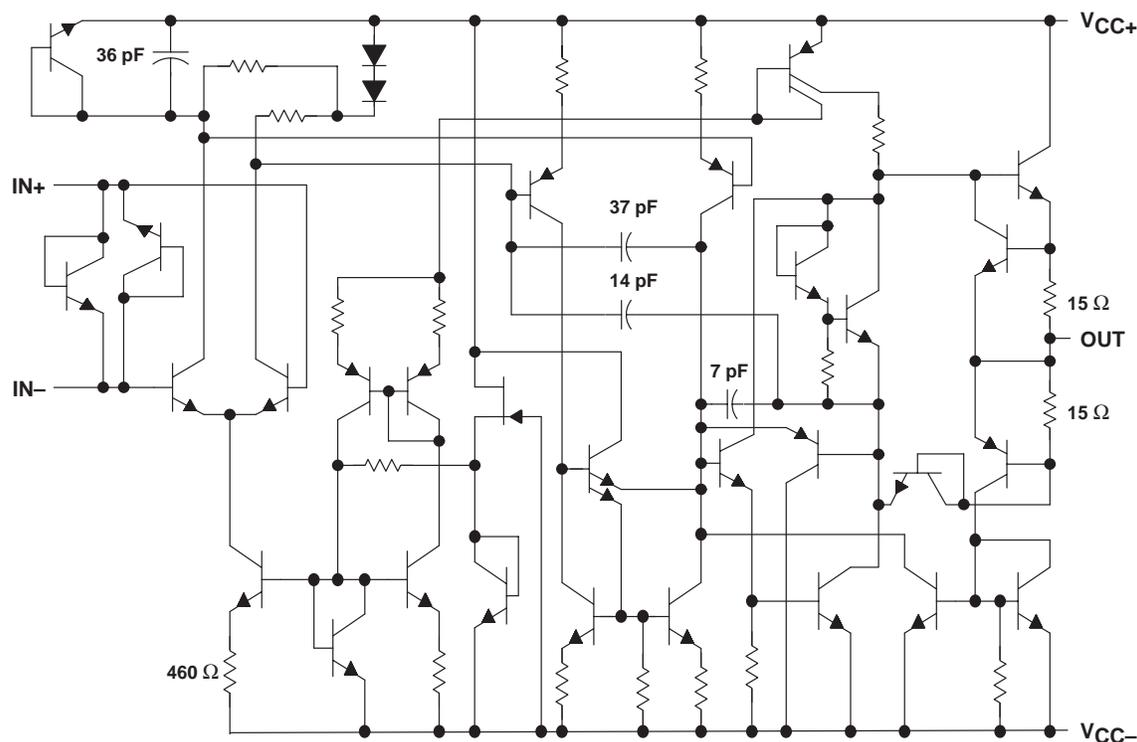
## symbol (each amplifier)



# NE5532, NE5532A DUAL LOW-NOISE OPERATIONAL AMPLIFIERS

SLOS075C – NOVEMBER 1979 – REVISED JUNE 2000

## 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
Package thermal impedance, $\theta_{JA}$ (see Note 5): P package	85°C/W
PS package	95°C/W
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds	260°C
Storage temperature range, $T_{stg}$	-65°C to 150°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.
  - The package thermal impedance is calculated in accordance with JESD 51.

# NE5532, NE5532A DUAL LOW-NOISE OPERATIONAL AMPLIFIERS

SLOS075C – NOVEMBER 1979 – REVISED JUNE 2000

## recommended operating conditions

	MIN	NOM	MAX	UNIT
Supply voltage, $V_{CC+}$	5		15	V
Supply voltage, $V_{CC-}$	-5		-15	V
Operating free-air temperature	0		70	°C

## 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
			$T_A = 0^\circ\text{C to } 70^\circ\text{C}$			5	
$I_{IO}$	Input offset current	$T_A = 25^\circ\text{C}$			10	150	nA
		$T_A = 0^\circ\text{C to } 70^\circ\text{C}$				200	
$I_{IB}$	Input bias current	$T_A = 25^\circ\text{C}$			200	800	nA
		$T_A = 0^\circ\text{C to } 70^\circ\text{C}$				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
			$T_A = 0^\circ\text{C to } 70^\circ\text{C}$	10			
		$R_L \geq 2\text{ k}\Omega$ , $V_O = \pm 10\text{ V}$	$T_A = 25^\circ\text{C}$	25	100		
			$T_A = 0^\circ\text{C to } 70^\circ\text{C}$	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			10	38	60	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		dB

† All characteristics are measured under open-loop conditions with zero common-mode input voltage unless otherwise specified.

# NE5532, NE5532A DUAL LOW-NOISE OPERATIONAL AMPLIFIERS

SLOS075C – NOVEMBER 1979 – REVISED JUNE 2000

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

PARAMETER	TEST CONDITIONS	NE5532			NE5532A			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	
SR	Slew rate at unity gain		9		9			V/ $\mu$ s
	Overshoot factor	$V_I = 100\text{ mV}$ , $R_L = 600\ \Omega$ ,	$A_{VD} = 1$ , $C_L = 100\text{ pF}$	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				



## **IMPORTANT NOTICE**

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgment, including those pertaining to warranty, patent infringement, and limitation of liability.

TI warrants performance of its semiconductor products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

Customers are responsible for their applications using TI components.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party's products or services does not constitute TI's approval, warranty or endorsement thereof.