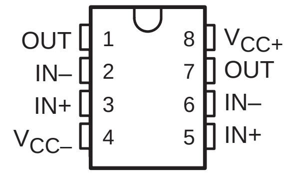
- **Equivalent Input Noise Voltage 5 nV/$\sqrt{Hz}$ Typ at 1 kHz**
- **Unity-Gain Bandwidth . . . 10 MHz Typ**
- **Common-Mode Rejection Ratio . . . 100 dB Typ**
- **High dc Voltage Gain . . . 100 V/mV Typ**
- **Peak-to-Peak Output Voltage Swing 32 V Typ With $V_{CC\pm}$ = ±18 V and R_L = 600 Ω**
- **High Slew Rate . . . 9 V/μs Typ**
- **Wide Supply Voltage Range . . . ±3 V to ±20 V**
- **Designed to Be Interchangeable With Signetics NE5532 and NE5532A**
- **Package Options Include Plastic Small-Outline (PS) Package and Standard Plastic (P) DIP**

**P OR PS PACKAGE
(TOP VIEW)**



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.

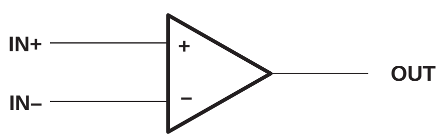
The NE5532 and NE5532A are characterized for operation from 0°C to 70°C.

AVAILABLE OPTIONS

T_A	PACKAGED DEVICES	
	PLASTIC DUAL-IN-LINE (P)	PLASTIC SMALL-OUTLINE (PS)
0°C to 70°C	NE5532P NE5532AP	NE5532PSR NE5532APSR

The PS package is only available taped and reeled.

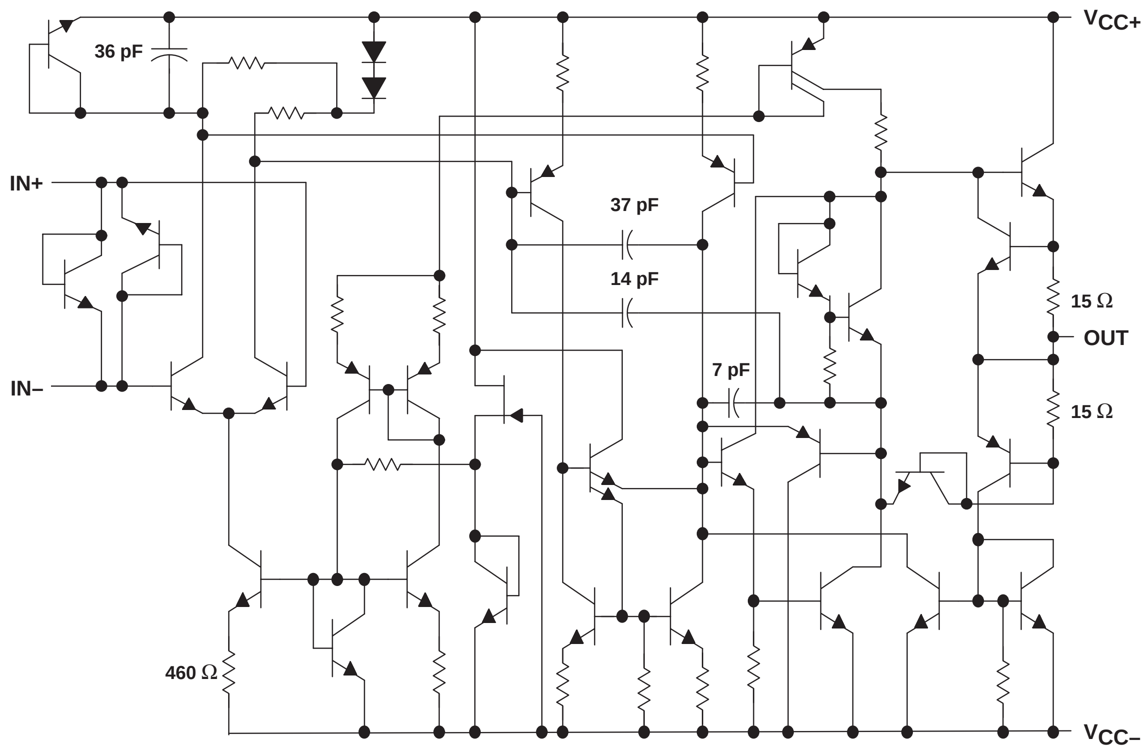
symbol (each amplifier)



PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

Copyright © 2000, Texas Instruments Incorporated

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)		±10 mA
Duration of output short circuit (see Note 4)		Unlimited
Package thermal impedance, θ_{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:
1. All voltage values, except differential voltages, are with respect to the midpoint between V_{CC+} and V_{CC-}.
2. The magnitude of the input voltage must never exceed the magnitude of the supply voltage.
3. 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.
4. 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.
5. The package thermal impedance is calculated in accordance with JESD 51-7.

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 V, T_A = 25°C (unless otherwise noted)

PARAMETER		TEST CONDITIONS†		MIN	TYP	MAX	UNIT
V_{IO}	Input offset voltage	V_O = 0	T_A = 25°C		0.5	4	mV
			T_A = 0°C to 70°C			5	
I_{IO}	Input offset current	T_A = 25°C			10	150	nA
		T_A = 0°C to 70°C				200	
I_{IB}	Input bias current	T_A = 25°C			200	800	nA
		T_A = 0°C to 70°C				1000	
V_{ICR}	Common-mode input-voltage range			±12	±13		V
V_{OPP}	Maximum peak-to-peak output-voltage swing	R_L ≥ 600 Ω	$V_{CC\pm}$ = ±15 V	24	26		V
			$V_{CC\pm}$ = ±18 V	30	32		
A_{VD}	Large-signal differential-voltage amplification	R_L ≥ 600 Ω, V_O = ±10 V	T_A = 25°C	15	50		V/mV
			T_A = 0°C to 70°C	10			
		R_L ≥ 2 kΩ, V_O = ±10 V	T_A = 25°C	25	100		
			T_A = 0°C to 70°C	15			
A_{vd}	Small-signal differential-voltage amplification	f = 10 kHz			2.2		V/mV
B_{OM}	Maximum-output-swing bandwidth	R_L = 600 Ω,	V_O = ±10 V		140		kHz
			$V_{CC\pm}$ = ±18 V, V_O = ±14 V		100		
B_1	Unity-gain bandwidth	R_L = 600 Ω,	C_L = 100 pF		10		MHz
r_i	Input resistance			30	300		kΩ
z_o	Output impedance	A_{VD} = 30 dB,	R_L = 600 Ω, f = 10 kHz		0.3		Ω
CMRR	Common-mode rejection ratio	V_{IC} = V_{ICR} min		70	100		dB
k_{SVR}	Supply voltage rejection ratio ($\Delta V_{CC\pm}/\Delta V_{IO}$)	$V_{CC\pm}$ = ±9 V to ±15 V,	V_O = 0	80	100		dB
I_{OS}	Output short-circuit current			10	38	60	mA
I_{CC}	Total supply curent	V_O = 0,	No load		8	16	mA
	Crosstalk attenuation (V_{O1}/V_{O2})	V_{01} = 10 V peak,	f = 1 kHz		110		dB

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

operating characteristics, $V_{CC\pm} = \pm15$ V, $T_A = 25°C$

PARAMETER		TEST CONDITIONS	NE5532			NE5532A			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
SR	Slew rate at unity gain			9			9		V/μs
	Overshoot factor	V_I = 100 mV, A_{VD} = 1, R_L = 600 Ω, C_L = 100 pF		10%			10%		
V_n	Equivalent input noise voltage	f = 30 Hz		8			8	10	$nV/\sqrt{Hz}$
		f = 1 kHz		5			5	6	
I_n	Equivalent input noise current	f = 30 Hz		2.7			2.7		$pA/\sqrt{Hz}$
		f = 1 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.

Copyright © 2000, Texas Instruments Incorporated