

Video amplifier

NE5592

DESCRIPTION

The NE5592 is a dual monolithic, two-stage, differential output, wideband video amplifier. It offers a fixed gain of 400 without external components and an adjustable gain from 400 to 0 with one external resistor. The input stage has been designed so that with the addition of a few external reactive elements between the gain select terminals, the circuit can function as a high-pass, low-pass, or band-pass filter. This feature makes the circuit ideal for use as a video or pulse amplifier in communications, magnetic memories, display, video recorder systems, and floppy disk head amplifiers.

- FEATURES**
- 110MHz unity gain bandwidth
 - Adjustable gain from 0 to 400
 - Adjustable pass band
 - No frequency compensation required
 - Wave shaping with minimal external components

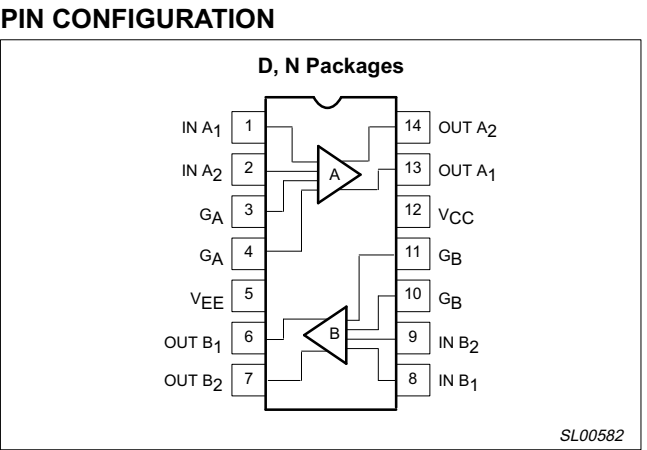


Figure 1. Pin Configuration

- APPLICATIONS**
- Floppy disk head amplifier
 - Video amplifier
 - Pulse amplifier in communications
 - Magnetic memory
 - Video recorder systems

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE	DWG #
14-Pin Plastic Dual In-Line Package (DIP)	0 to 70°C	NE5592N	SOT27-1
14-Pin Small Outline (SO) package	0 to 70°C	NE5592D	SOT108-1

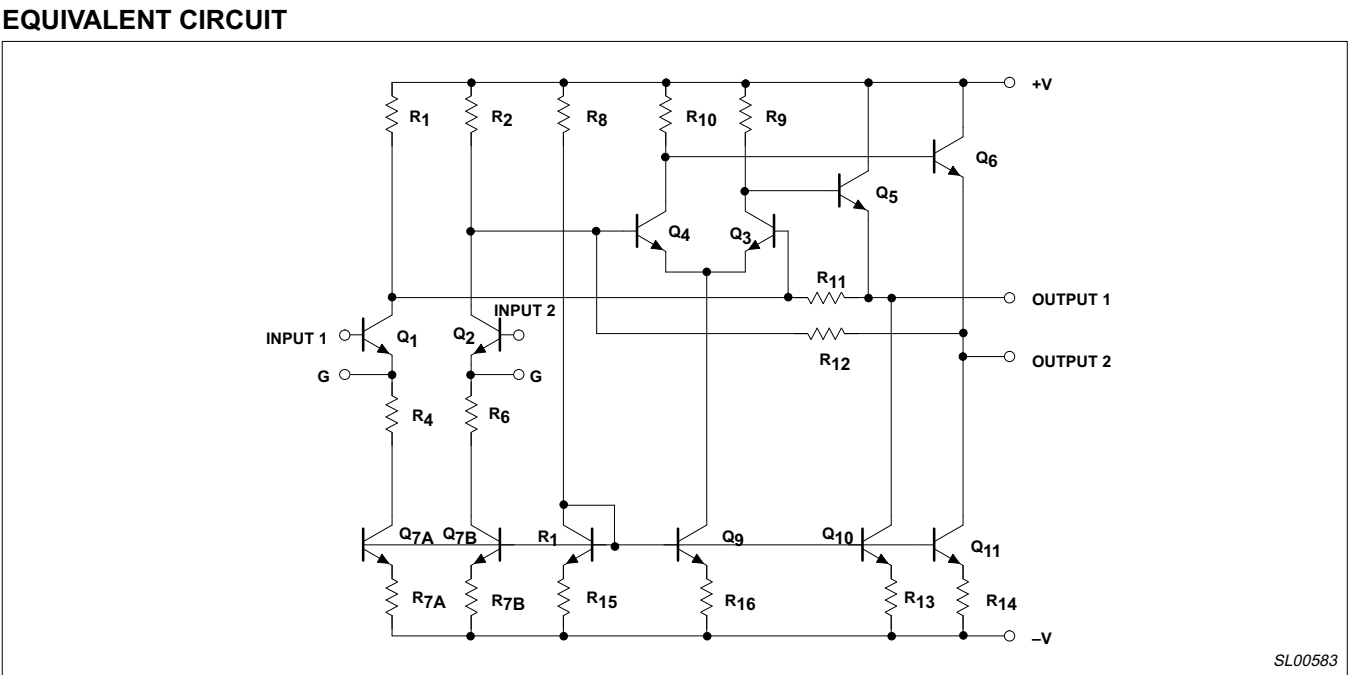


Figure 2. Equivalent Circuit

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ABSOLUTE MAXIMUM RATINGS

$T_A=25^{\circ}\text{C}$, unless otherwise specified.

SYMBOL	PARAMETER	RATING	UNIT
V_{CC}	Supply voltage	± 8	V
V_{IN}	Differential input voltage	± 5	V
V_{CM}	Common mode Input voltage	± 6	V
I_{OUT}	Output current	10	mA
T_A	Operating temperature range NE5592	0 to $+70$	$^{\circ}\text{C}$
T_{STG}	Storage temperature range	-65 to $+150$	$^{\circ}\text{C}$
$P_{D\text{ MAX}}$	Maximum power dissipation, $T_A=25^{\circ}\text{C}$ (still air) ¹		
	D package	1.03	W
	N package	1.48	W

NOTES:

- Derate above 25°C at the following rates:
D package $8.3\text{mW}/^{\circ}\text{C}$
N package $11.9\text{mW}/^{\circ}\text{C}$

DC ELECTRICAL CHARACTERISTICS

$T_A=+25^{\circ}\text{C}$, $V_{SS}=\pm 6\text{V}$, $V_{CM}=0$, unless otherwise specified. Recommended operating supply voltage is $V_S = \pm 6.0\text{V}$, and gain select pins are connected together.

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNITS
			Min	Typ	Max	
A_{VOL}	Differential voltage gain	$R_L=2\text{k}\Omega$, $V_{OUT}=3V_{P-P}$	400	480	600	V/V
R_{IN}	Input resistance		3	14		$\text{k}\Omega$
C_{IN}	Input capacitance			2.5		pF
I_{OS}	Input offset current			0.3	3	μA
I_{BIAS}	Input bias current			5	20	μA
	Input noise voltage	BW 1kHz to 10MHz		4		$\text{nV}/\sqrt{\text{Hz}}$
V_{IN}	Input voltage range		± 1.0			V
$CMRR$	Common-mode rejection ratio	$V_{CM} \pm 1\text{V}$, $f < 100\text{kHz}$ $V_{CM} \pm 1\text{V}$, $f = 5\text{MHz}$	60	93 87		dB dB
$PSRR$	Supply voltage rejection ratio	$\Delta V_S = \pm 0.5\text{V}$	50	85		dB
	Channel separation	$V_{OUT}=1V_{P-P}$; $f=100\text{kHz}$ (output referenced) $R_L=1\text{k}\Omega$	65	70		dB
V_{OS}	Output offset voltage gain select pins open	$R_L=\infty$ $R_L=\infty$		0.5 0.25	1.5 0.75	V V
V_{CM}	Output common-mode voltage	$R_L=\infty$	2.4	3.1	3.4	V
V_{OUT}	Output differential voltage swing	$R_L=2\text{k}\Omega$	3.0	4.0		V
R_{OUT}	Output resistance			20		Ω
I_{CC}	Power supply current (total for both sides)	$R_L=\infty$		35	44	mA

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DC ELECTRICAL CHARACTERISTICS

$V_{SS} = \pm 6V$, $V_{CM} = 0$, $0^{\circ}C \leq T_A \leq 70^{\circ}C$, unless otherwise specified. Recommended operating supply voltage is $V_S = \pm 6.0V$, and gain select pins are connected together.

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNITS
			Min	Typ	Max	
A _{VOL}	Differential voltage gain	R _L =2kΩ, V _{OUT} =3V _{P-P}	350	430	600	V/V
R _{IN}	Input resistance		1	11		kΩ
I _{OS}	Input offset current				5	μA
I _{BIAS}	Input bias current				30	μA
V _{IN}	Input voltage range		±1.0			V
CMRR	Common-mode rejection ratio	V _{CM} ± 1V, f<100kHz R _S =φ	55			dB
PSRR	Supply voltage rejection ratio	ΔV _S = ± 0.5V	50			dB
	Channel separation	V _{OUT} =1V _{P-P} ; f=100kHz (output referenced) R _L =1kΩ		70		dB
V _{OS}	Output offset voltage gain select pins connected together	R _L =∞			1.5	V
	gain select pins open	R _L =∞			1.0	V
V _{OUT}	Output differential voltage swing	R _L =2kΩ	2.8			V
I _{CC}	Power supply current (total for both sides)	R _I = ∞			47	mA

AC ELECTRICAL CHARACTERISTICS

T_A=+25°C V_{SS}=±6V, V_{CM}=0, unless otherwise specified. Recommended operating supply voltage V_S=±6.0V. Gain select pins connected together.

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNITS
			Min	Typ	Max	
BW	Bandwidth	$V_{OUT}=1V_{P-P}$		25		MHz
t_R	Rise time			15	20	ns
t_{PD}	Propagation delay	$V_{OUT}=1V_{P-P}$		7.5	12	ns

TEST CIRCUITS $T_A=25^{\circ}\text{C}$ unless otherwise specified.

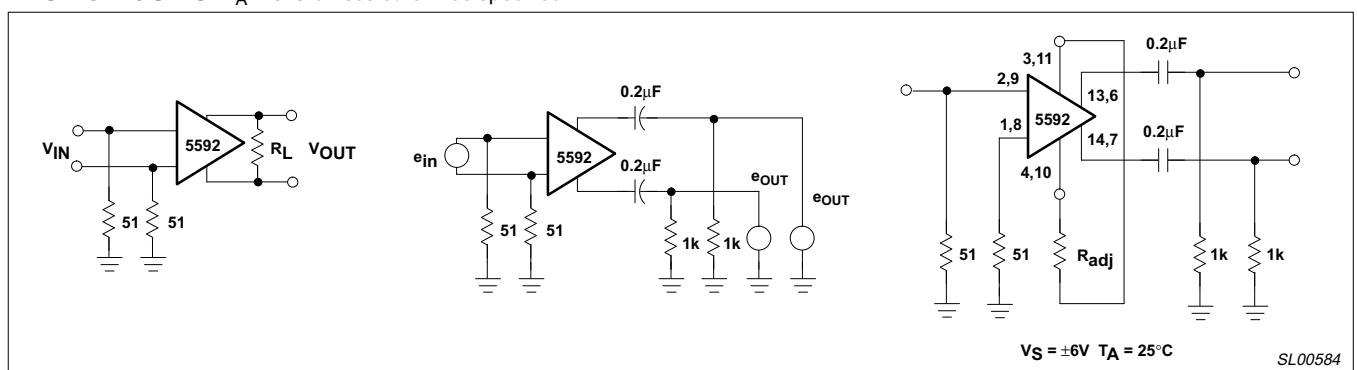


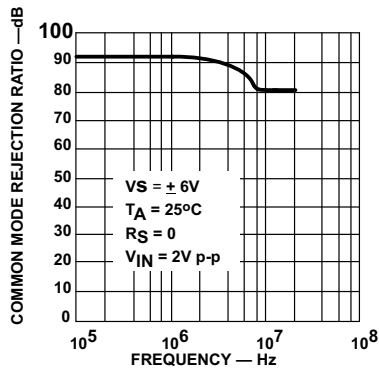
Figure 3. Test Circuits

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TYPICAL PERFORMANCE CHARACTERISTICS

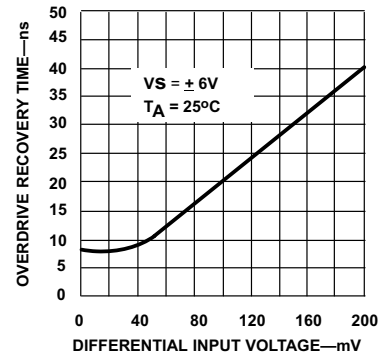
Common-Mode Rejection Ratio as a Function of Frequency



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Figure 4.

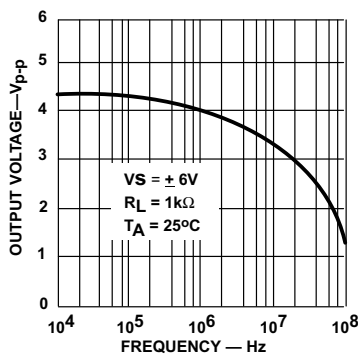
Differential Overdrive Recovery Time



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Figure 7.

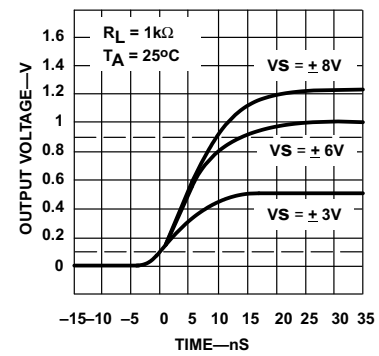
Output Voltage Swing as a Function of Frequency



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Figure 5.

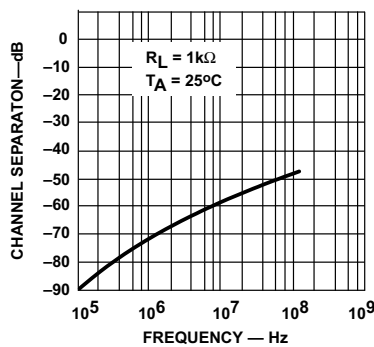
Pulse Response as a Function of Supply Voltage



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Figure 8.

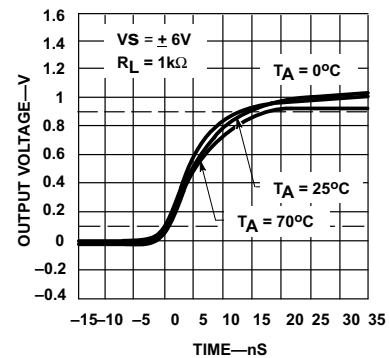
Channel Separation as a Function of Frequency



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Figure 6.

Pulse Response as a Function of Temperature



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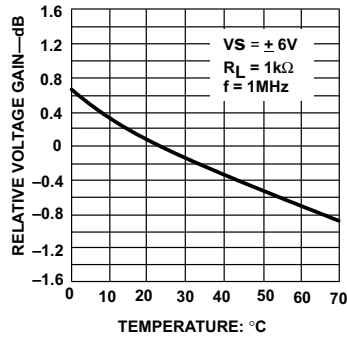
Figure 9.

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TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

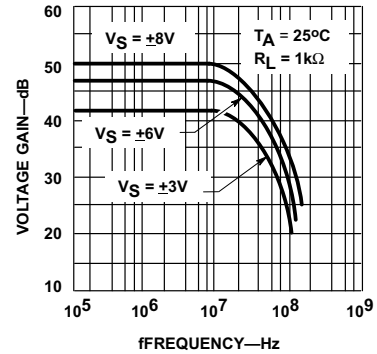
Voltage Gain as a Function of Temperature



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Figure 10.

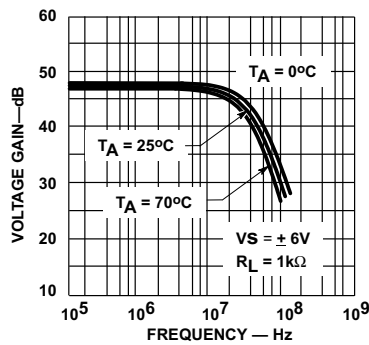
Gain vs Frequency as a Function of Supply Voltage



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Figure 13.

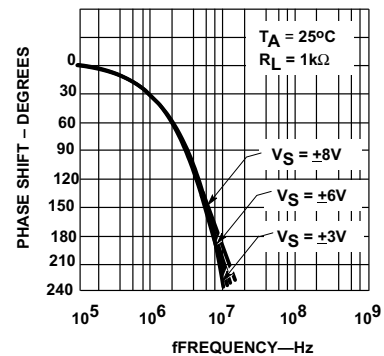
Gain vs Frequency as a Function of Temperature



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Figure 11.

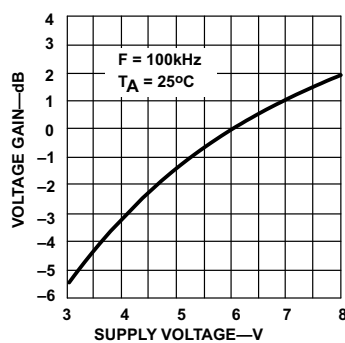
Phase vs Frequency as a Function of Supply Voltage



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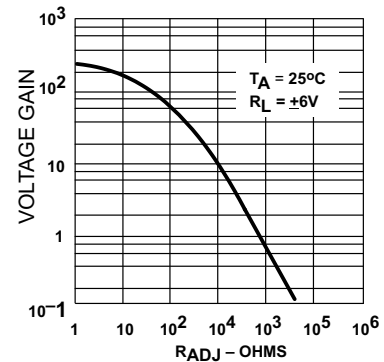
Figure 14.

Voltage Gain as a Function of Supply Voltage



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Figure 12.

Voltage Gain as a Function of R_{ADJ} 

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Figure 15.

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TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

