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

PIN CONFIGURATION

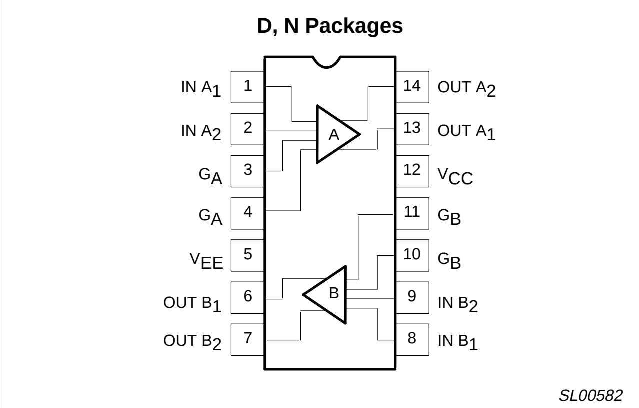

Figure 1. Pin Configuration

APPLICATIONS

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

ORDERING INFORMATION

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

EQUIVALENT CIRCUIT

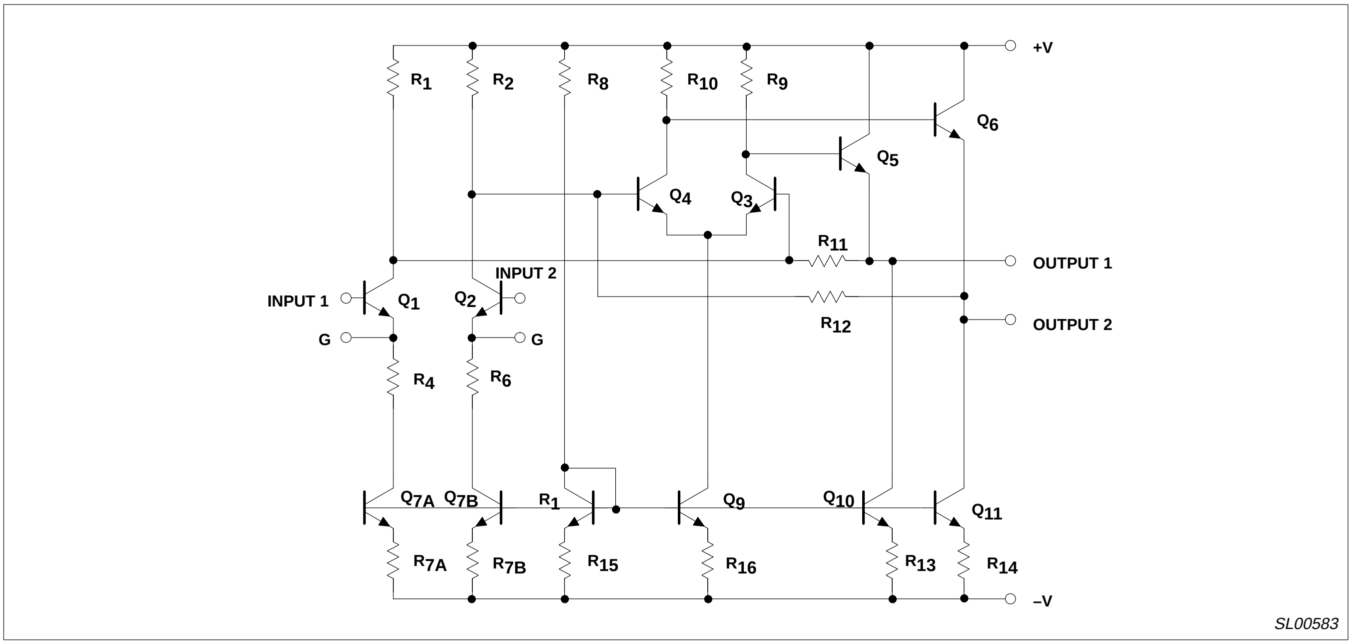

Figure 2. Equivalent Circuit

ABSOLUTE MAXIMUM RATINGS

T_A=25°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	°C
T_{STG}	Storage temperature range	-65 to +150	°C
$P_{D\ MAX}$	Maximum power dissipation, T_A=25°C (still air)[1] D package N package	 1.03 1.48	 W W

NOTES:

1. Derate above 25°C at the following rates:
   D package 8.3mW/°C
   N package 11.9mW/°C

DC ELECTRICAL CHARACTERISTICS

T_A=+25°C, V_{SS}=±6V, V_{CM}=0, unless otherwise specified. Recommended operating supply voltage is V_S = ±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}	400	480	600	V/V
R_{IN}	Input resistance		3	14		kΩ
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		nV/√Hz
V_{IN}	Input voltage range		±1.0			V
CMRR	Common-mode rejection ratio	V_{CM} ± 1V, f<100kHz V_{CM} ± 1V, f=5MHz	60	93 87		dB dB
PSRR	Supply voltage rejection ratio	ΔV_S= ± 0.5V	50	85		dB
	Channel separation	V_{OUT}=1V_{P-P}; f=100kHz (output referenced) R_L=1kΩ	65	70		dB
V_{OS}	Output offset voltage gain select pins open	R_L=∞ R_L=∞		0.5 0.25	1.5 0.75	V V
V_{CM}	Output common-mode voltage	R_L=∞	2.4	3.1	3.4	V
V_{OUT}	Output differential voltage swing	R_L=2kΩ	3.0	4.0		V
R_{OUT}	Output resistance			20		Ω
I_{CC}	Power supply current (total for both sides)	R_L=∞		35	44	mA

DC ELECTRICAL CHARACTERISTICS

V_{SS}=±6V, V_{CM}=0, 0°C ≤ T_A ≤ 70°C, unless otherwise specified. Recommended operating supply voltage is V_S = ±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_L=∞			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°C unless otherwise specified.

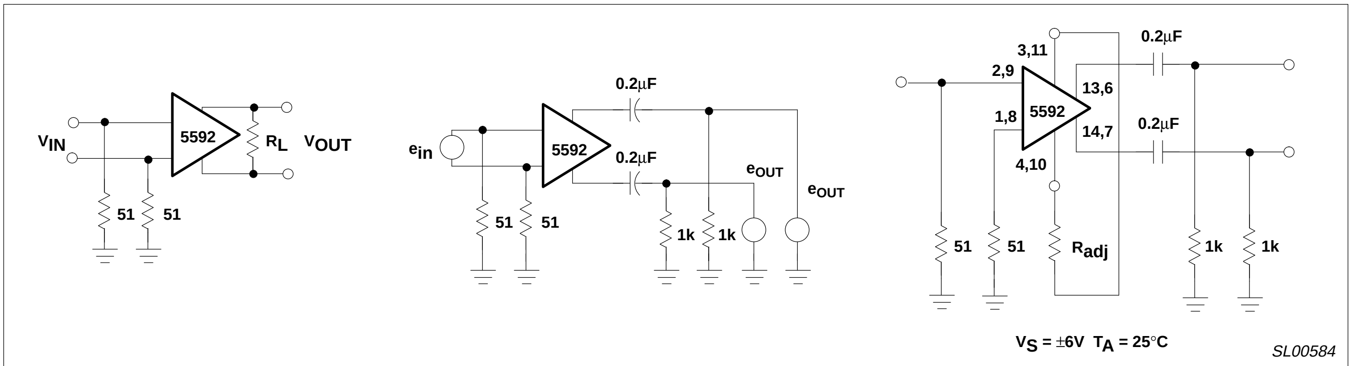

Figure 3. Test Circuits

TYPICAL PERFORMANCE CHARACTERISTICS

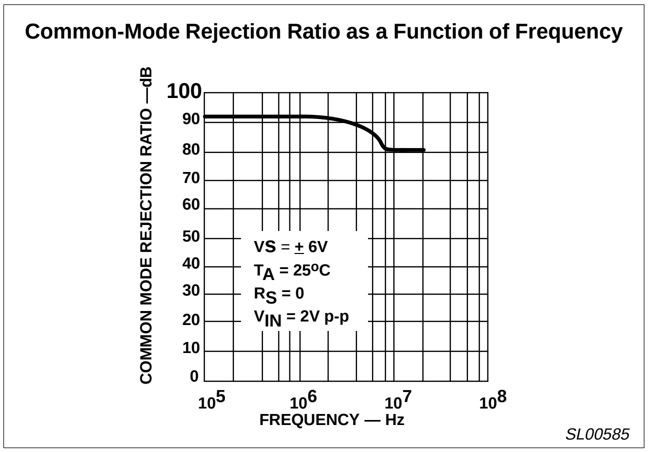

Figure 4.

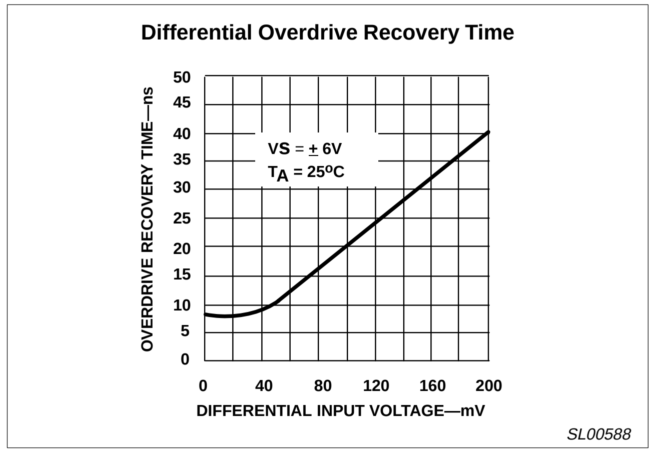

Figure 7.

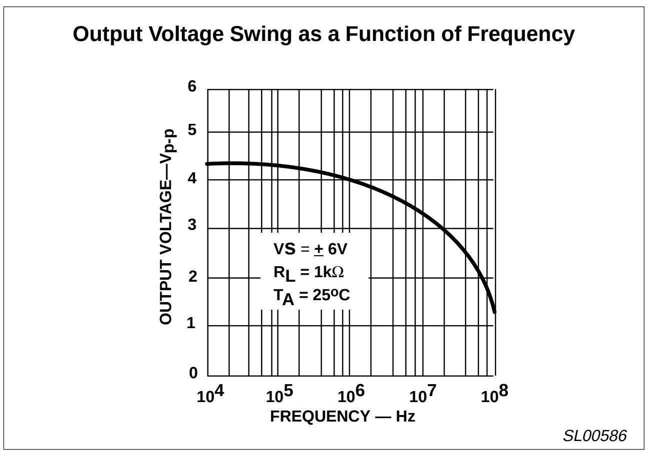

Figure 5.

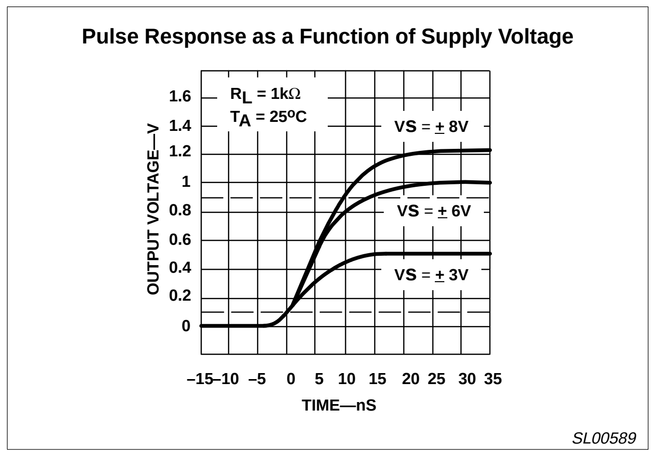

Figure 8.

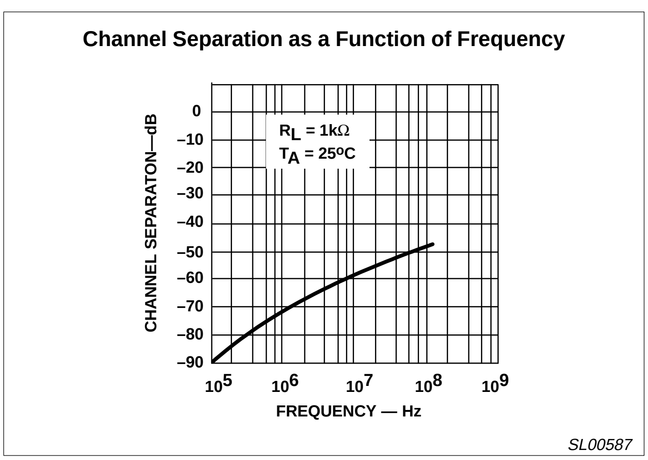

Figure 6.

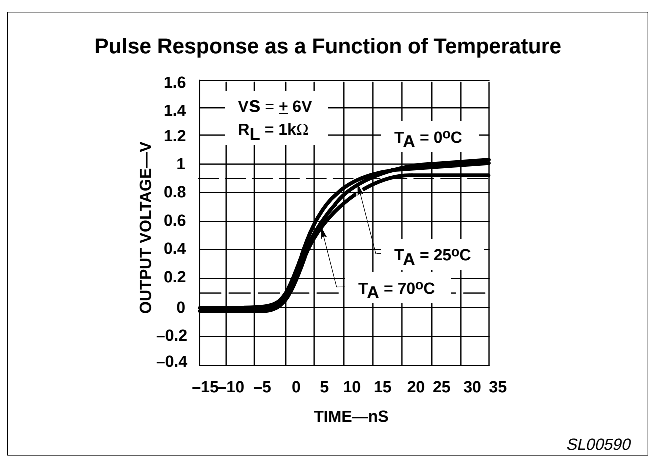

Figure 9.

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

Voltage Gain as a Function of Temperature

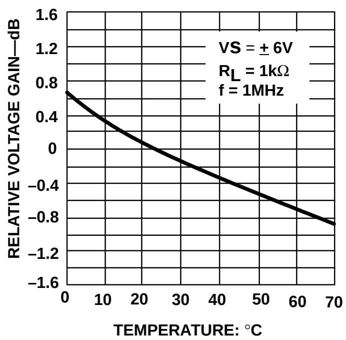

Figure 10.

Gain vs Frequency as a Function of Supply Voltage

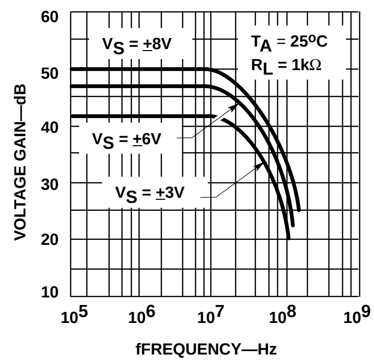

Figure 13.

Gain vs Frequency as a Function of Temperature

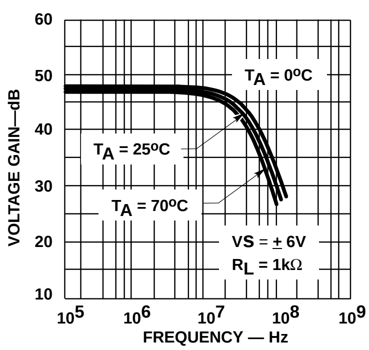

Figure 11.

Phase vs Frequency as a Function of Supply Voltage

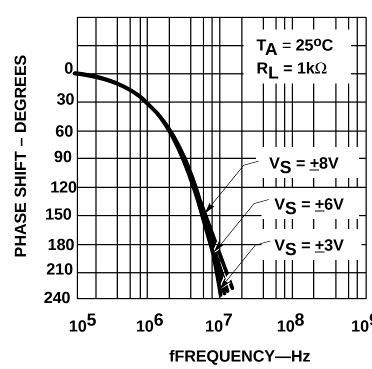

Figure 14.

Voltage Gain as a Function of Supply Voltage

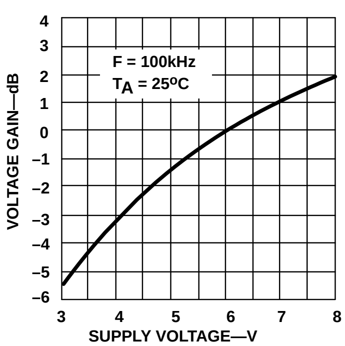

Figure 12.

Voltage Gain as a Function of R_{ADJ}

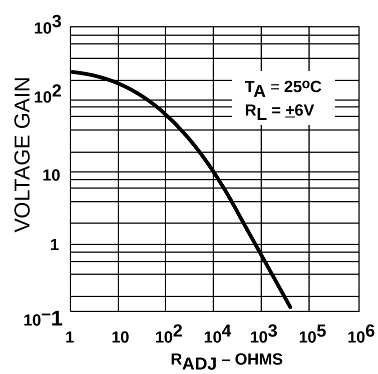

Figure 15.

Video amplifier NE5592

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

Supply Current as a Function of Temperature

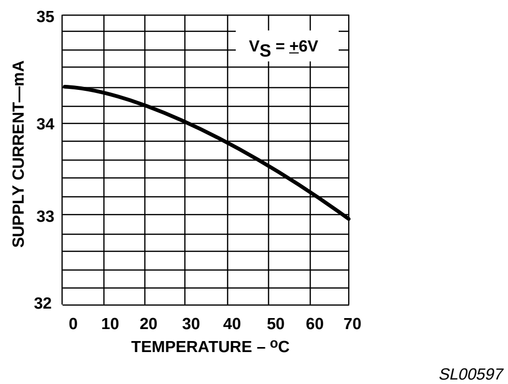

Figure 16.

Supply Current as a Function of Supply Voltage

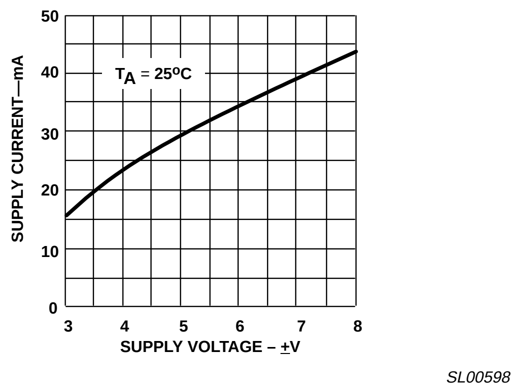

Figure 17.

Output Voltage Swing and Sink Current as a Function of Supply Voltage

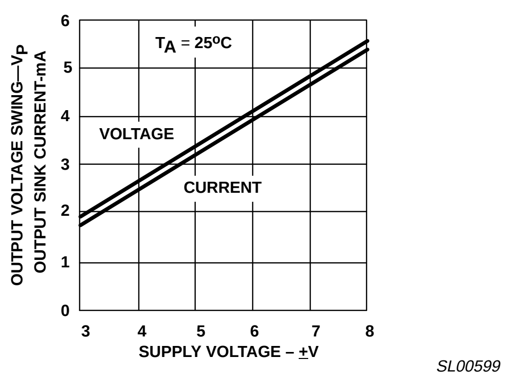

Figure 18.

Output Voltage Swing as a Function of Load Resistance

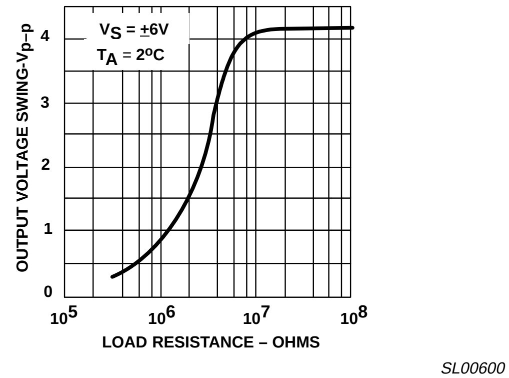

Figure 19.

Input Resistance as a Function of Temperature

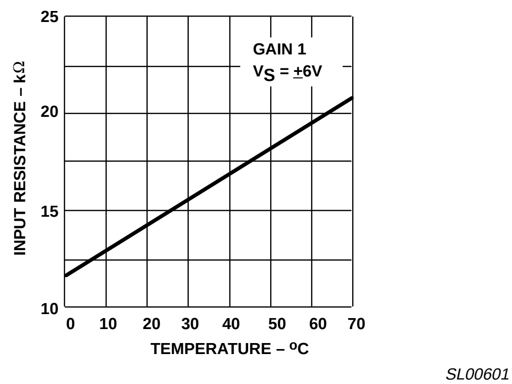

Figure 20.

Input Noise Voltage as a Function of Frequency

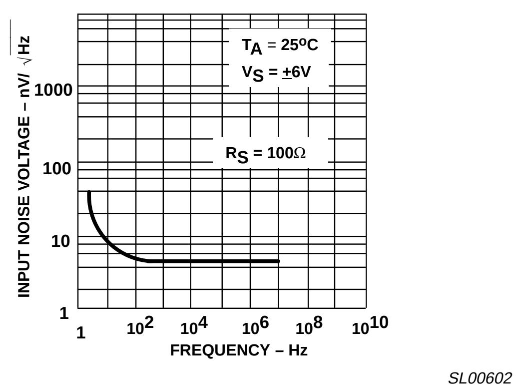

Figure 21.