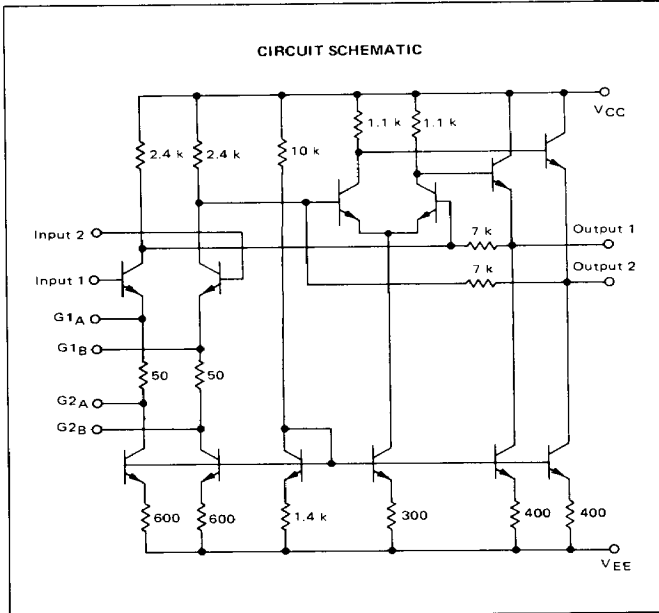


**DIFFERENTIAL TWO STAGE VIDEO AMPLIFIER**

The SE/NE592 is a monolithic, two stage, differential output, wideband video amplifier. It offers fixed gains of 100 and 400 without external components and adjustable gains 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 and video recorder systems. The 592 is a pin-for-pin replacement for the MC1733.

- 90 MHz Bandwidth
- Adjustable Gains From 0 to 400
- Adjustable Pass Band
- No Frequency Compensation Required



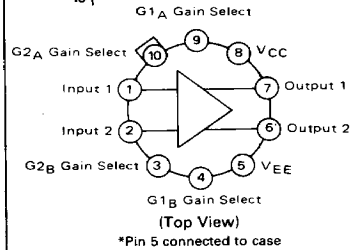
**NE592**  
**SE592**

**VIDEO AMPLIFIER**

**SILICON MONOLITHIC**  
**INTEGRATED CIRCUIT**



**H SUFFIX**  
**METAL PACKAGE**  
**CASE 603**

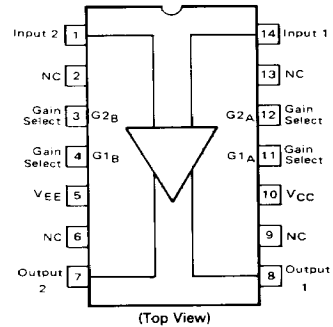


**N SUFFIX**  
**PLASTIC PACKAGE**  
**CASE 646**



**D SUFFIX**  
**PLASTIC PACKAGE**  
**CSE 751A**  
**(SO-14)**

**PIN CONNECTIONS**



**ORDERING INFORMATION**

Device	Temperature Range	Package
NE592D	0 to 70°C	SO-14
NE592N		Plastic DIP
NE592H		Metal Can
SE592H	-55 to +125°C	Metal Can

# NE592, SE592

2

## MAXIMUM RATINGS (T<sub>A</sub> = +25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Power Supply Voltage	V <sub>CC</sub>	+8.0	Volts
	V <sub>EE</sub>	-8.0	Volts
Differential Input Voltages	V <sub>ID</sub>	±5.0	Volts
Common-Mode Input Voltage	V <sub>IC</sub>	±6.0	Volts
Output Current	I <sub>O</sub>	10	mA
Operating Ambient Temperature Range	T <sub>A</sub>	SE592	-55 to +125
		NE592	0 to +70
Operating Junction Temperature Range	T <sub>J</sub>	Metal and Ceramic Packages	175
		Plastic Package	150
Storage Temperature Range	T <sub>stg</sub>	Metal and Ceramic Package	-65 to +150
		Plastic Package	-55 to +125

## ELECTRICAL CHARACTERISTICS T<sub>A</sub> = 25°C unless otherwise noted. (V<sub>CC</sub> = +6.0 V, V<sub>EE</sub> = -6.0 V, V<sub>CM</sub> = 0)

Characteristic	Symbol	SE592			NE592			Units
		Min	Typ	Max	Min	Typ	Max	
Differential Voltage Gain – Figure 3 (R <sub>L</sub> = 2 kΩ, e <sub>out</sub> = 3 Vp-p) (Gain 1, Note 1) (Gain 2, Note 2)	A <sub>vd</sub>	300 90	400 100	500 110	250 80	400 100	600 120	V/V
Bandwidth – Figure 3 (Gain 1, Note 1) (Gain 1, Note 2)	BW	– –	40 90	– –	– –	40 90	– –	MHz
Rise Time – Figure 3 (Gain 1, e <sub>out</sub> = 1 Vp-p, Note 1) (Gain 2, e <sub>out</sub> = 1 Vp-p, Note 2)	t <sub>PLH</sub> t <sub>THL</sub>	– –	10.5 4.5	– 10	– –	10.5 4.5	– 12	ns
Propagation Delay – Figure 3 (Gain 1, e <sub>out</sub> = 1 Vp-p, Note 1) (Gain 2, e <sub>out</sub> = 1 Vp-p, Note 2)	t <sub>PLH</sub> t <sub>PHL</sub>	– –	7.5 6.0	– 10	– –	7.5 6.0	– 10	ns
Input Resistance (Gain 1, Note 1) (Gain 2, Note 2)	R <sub>in</sub>	– 20	4.0 30	– –	– 10	4.0 30	– –	kΩ
Input Capacitance (Gain 2, Note 2)	C <sub>in</sub>	–	2.0	–	–	2.0	–	pF
Input Offset Current (Gain 3, Note 3) – Fig. 2	I <sub>IO</sub>	–	0.4	3.0	–	0.4	5.0	μA
Input Bias Current (Gain 3, Note 3) – Fig. 2	I <sub>IB</sub>	–	9.0	20	–	9.0	30	μA
Input Noise Voltage (Gain 1 and Gain 2) (BW = 1 kHz to 10 MHz) – Figure 1	V <sub>n</sub>	–	12	–	–	12	–	μV (rms)
Input Voltage Range (Gain 2, Note 2) – Fig. 3	V <sub>in</sub>	±1.0	–	–	±1.0	–	–	V
Common-Mode Rejection Ratio – Figure 3 (Gain 2, V <sub>CM</sub> = ±1 V, f ≤ 100 kHz) (Gain 2, V <sub>CM</sub> = ±1 V, f = 5 MHz)	CMRR	60 –	86 60	–	60 –	86 60	– –	dB
Supply Voltage Rejection Ratio – Figure 2 (Gain 2, ΔV <sub>S</sub> = ±0.5 V)	PSRR	50	70	–	50	70	–	dB
Output Offset Voltage – Figure 2 (Gain 3, R <sub>L</sub> = ∞, Note 3)	V <sub>OO</sub>	–	0.35	0.75	–	0.35	0.75	V
Output Common-Mode Voltage – Figure 2 (R <sub>L</sub> = ∞, Gain 3, Note 3)	V <sub>CMO</sub>	2.4	2.9	3.4	2.4	2.9	3.4	V
Output Voltage Swing – Figure 3 (R <sub>L</sub> = 2k, Gain 2, Note 2)	V <sub>O</sub>	3.0	4.0	–	3.0	4.0	–	Vp-p
Output Resistance	r <sub>o</sub>	–	20	–	–	20	–	Ω
Power Supply Current – Figure 2 (R <sub>L</sub> = ∞, Gain 2, Note 2)	I <sub>D</sub>	–	18	24	–	18	24	mA

Note 1. Gain select pins G1<sub>A</sub> and G1<sub>B</sub> connected together.

Note 2. Gain select pins G2<sub>A</sub> and G2<sub>B</sub> connected together.

Note 3. All gain select pins open.

# NE592, SE592

ELECTRICAL CHARACTERISTICS  $T_A = T_{high}$  to  $T_{low}$  unless otherwise noted.\* ( $V_{CC} = +6.0$  Vdc,  $V_{EE} = -6.0$  Vdc,  $V_{CM} = 0$ )

Characteristic	Symbol	SE592			NE592			Units
		Min	Typ	Max	Min	Typ	Max	
Differential Voltage Gain – Figure 3 ( $R_L = 2$ k $\Omega$ , $e_{out} = 3$ Vp-p) (Gain 1, Note 1) (Gain 2, Note 2)	$A_{vd}$	200 80	–	600 120	250 80	–	600 120	V/V
Input Resistance (Gain 2)	$R_{in}$	8.0	–	–	8.0	–	–	k $\Omega$
Input Offset Current (Gain 3) – Figure 2	$ I_{IO} $	–	–	5.0	–	–	6.0	$\mu$ A
Input Bias Current (Gain 3) – Figure 2	$I_{IB}$	–	–	40	–	–	40	$\mu$ A
Input Voltage Range (Gain 2) – Figure 3	$V_{in}$	$\pm 1.0$	–	–	$\pm 1.0$	–	–	V
Common-Mode Rejection Ratio – Figure 3 (Gain 2, $V_{CM} = \pm 1$ V, $f \leq 100$ kHz)	CMRR	50	–	–	50	–	–	dB
Supply Voltage Rejection Ratio – Figure 2 (Gain 2, $\Delta V_S = \pm 0.5$ V)	PSRR	50	–	–	50	–	–	dB
Output Offset Voltage (Gain 3) – Figure 2	$V_{OO}$	–	–	1.2	–	–	1.5	V
Output Voltage Swing (Gain 2) – Figure 3	$V_O$	2.5	–	–	2.5	–	–	Vp-p
Power Supply Current (Gain 2) – Figure 2	$I_D$	–	–	27	–	–	27	mA

\* $T_{low} = 0^\circ\text{C}$  for NE592,  $-55^\circ\text{C}$  for SE592  
 $T_{high} = +70^\circ\text{C}$  for NE592,  $+125^\circ\text{C}$  for SE592

## GENERAL TEST CIRCUITS FIGURE 1

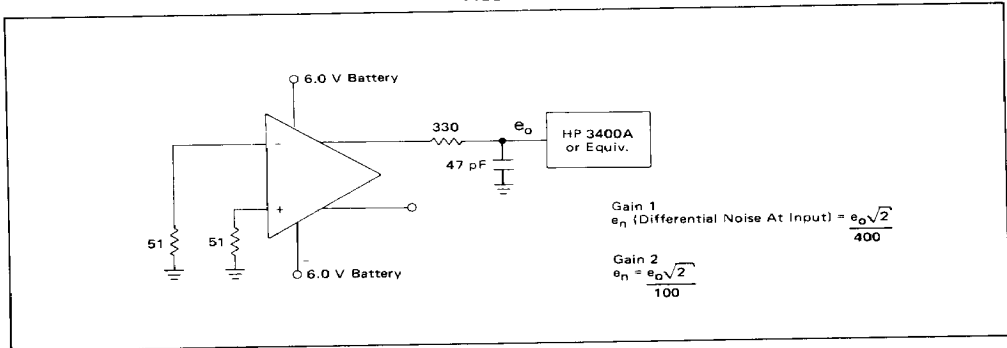


FIGURE 2

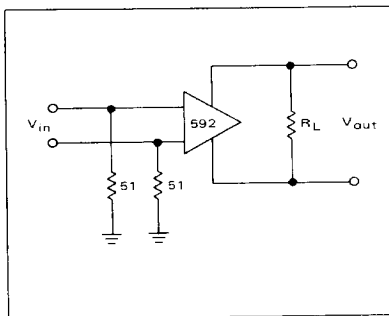
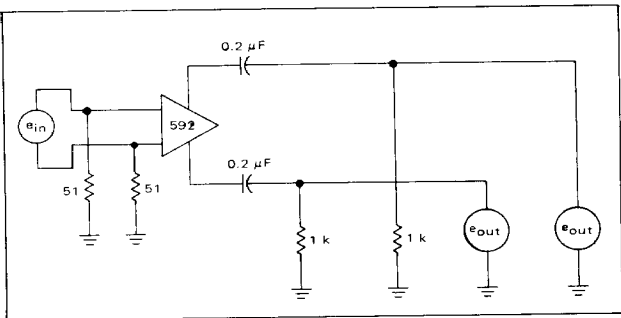


FIGURE 3



# NE592, SE592

FIGURE 4 – GAIN 1 versus FREQUENCY

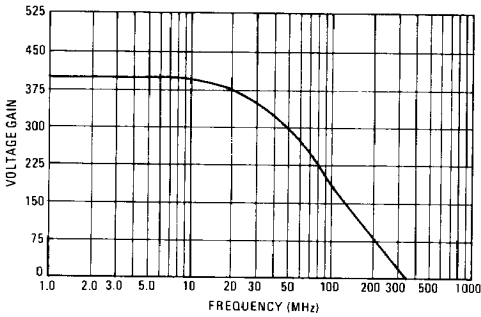


FIGURE 5 – GAIN 2 versus FREQUENCY

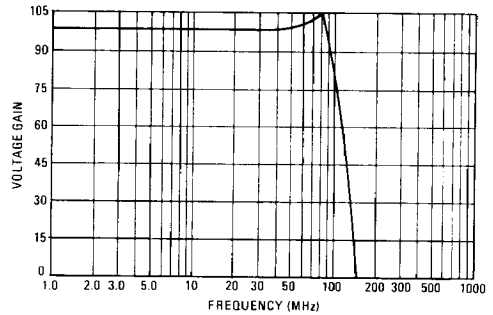


FIGURE 6 – OUTPUT VOLTAGE SWING AS A FUNCTION OF FREQUENCY

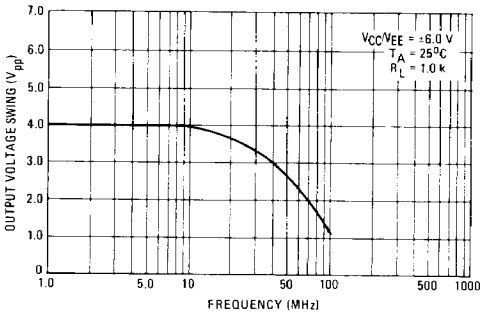


FIGURE 7 – OUTPUT VOLTAGE SWING AS A FUNCTION OF LOAD RESISTANCE

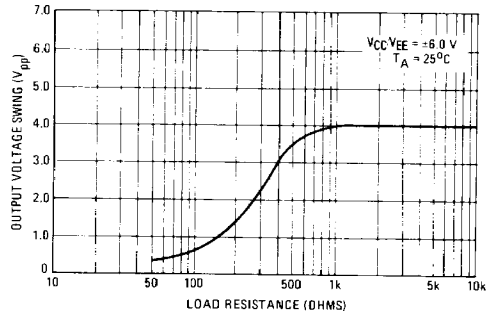
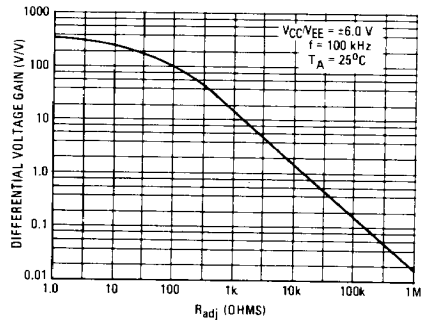
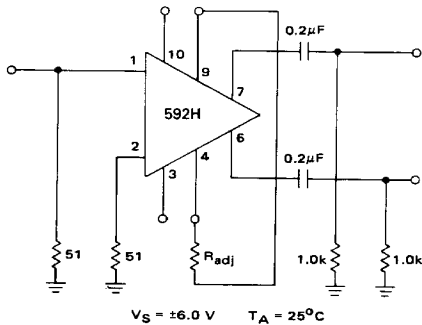


FIGURE 8 – VOLTAGE GAIN AS A FUNCTION OF R<sub>adj</sub> RESISTANCE



# NE592, SE592

FIGURE 9 – DISK/TAPE PHASE MODULATED READBACK SYSTEMS

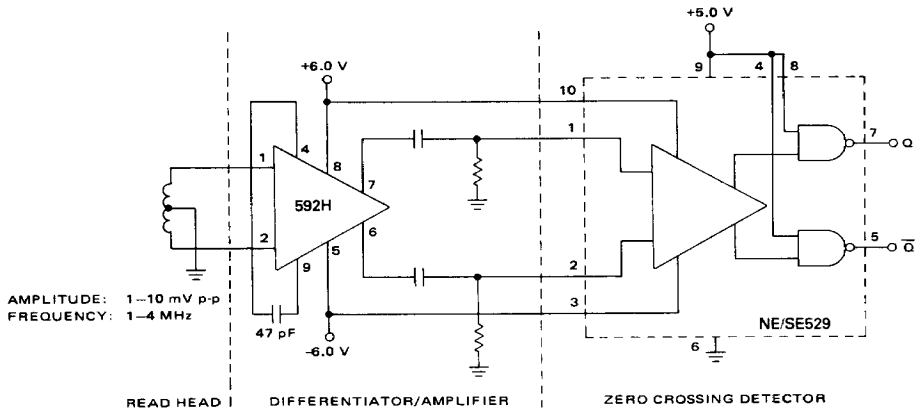
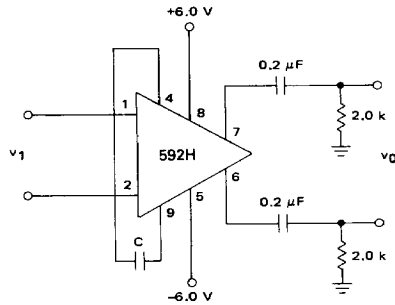


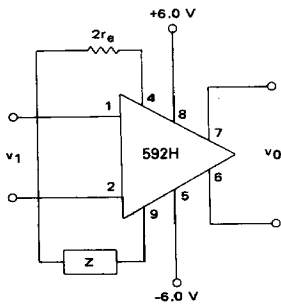
FIGURE 10 – DIFFERENTIATION WITH HIGH COMMON MODE NOISE REJECTION



FOR FREQUENCY  $f_1 \ll 1/2 \pi (32) C$

$$v_o \approx 1.4 \times 10^4 C \frac{dv_1}{dt}$$

FIGURE 11 – FILTER NETWORKS



$$\frac{v_o(s)}{v_1(s)} \approx \frac{1.4 \times 10^4}{Z(s) + 2r_e}$$

$$\approx \frac{1.4 \times 10^4}{Z(s) + 32}$$

BASIC CONFIGURATION

Z NETWORK	FILTER TYPE	$v_o(s)$ TRANSFER FUNCTION
	Low Pass	$\frac{1.4 \times 10^4}{L} \left[ \frac{1}{s + R/L} \right]$
	High Pass	$\frac{1.4 \times 10^4}{R} \left[ \frac{s}{s + 1/RC} \right]$
	Band Pass	$\frac{1.4 \times 10^4}{L} \left[ \frac{1}{s^2 + R/L + 1/LC} \right]$
	Band Reject	$\frac{1.4 \times 10^4}{R} \left[ \frac{s^2 + 1/LC}{s^2 + 1/LC + s/RC} \right]$

NOTE: In the networks above, the R value used is assumed to include  $2r_e$ , or approximately 30 Ohms.