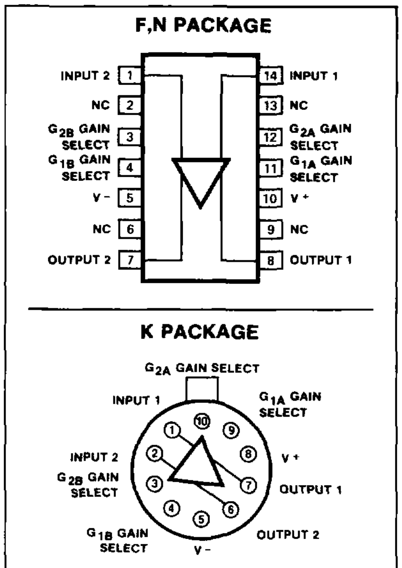
DESCRIPTION

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 μA733.

FEATURES

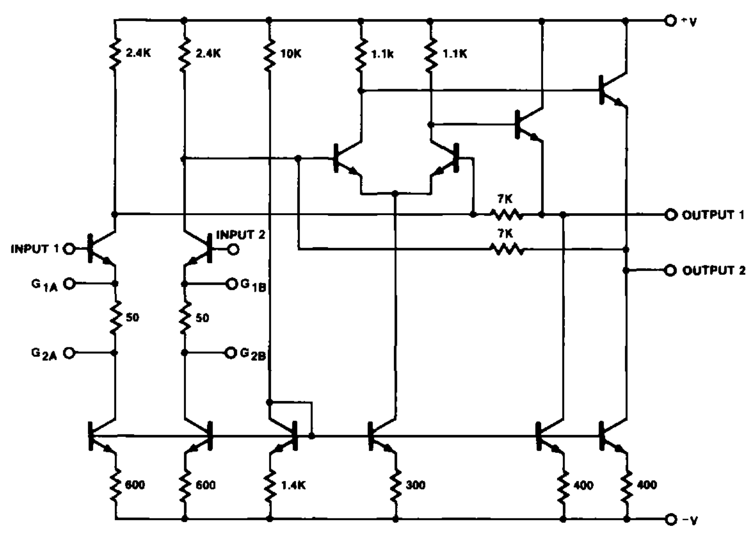
- **120MHz bandwidth**
- **Adjustable gains from 0 to 400**
- **Adjustable pass band**
- **No frequency compensation required**

PIN CONFIGURATION



NOTE
Pin 5 connected to case.

EQUIVALENT CIRCUIT



ABSOLUTE MAXIMUM RATINGS $T_A = 25°C$ unless otherwise specified.

PARAMETER	RATING	UNIT
Supply voltage	±8	V
Differential input voltage	±5	V
Common mode Input voltage	±6	V
Output current	10	mA
Operating temperature range		
SE592K	-55 to +125	°C
NE592K	0 to +70	°C
Storage temperature range	-65 to +150	°C
Power dissipation	500	mW

NE/SE592-F,K,N

DC ELECTRICAL CHARACTERISTICS

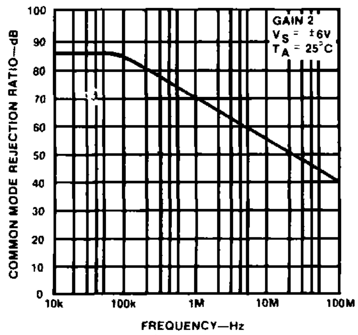
$T_A = +25°C$, $V_S = \pm6V$, $V_{CM} = 0$ unless otherwise specified
Recommend operating supply voltages $V_S = \pm6.0V$

PARAMETER	TEST CONDITIONS	NE592			SE592			UNITS
		Min	Typ	Max	Min	Typ	Max	
Differential voltage gain								
Gain 1[1]	$R_L = 2k\Omega$, $V_{OUT} = 3V$ p-p	250	400	600	300	400	500	V/V
Gain 2[2]		80	100	120	90	100	110	V/V
Bandwidth								
Gain 1[1]			40			40		MHz
Gain 2[2]			90			90		MHz
Rise time								
Gain 1[1]	$V_{OUT} = 1V$ p-p		10.5			10.5		ns
Gain 2[2]			4.5	12		4.5	10	ns
Propagation delay								
Gain 1[1]	$V_{OUT} = 1V$ p-p		7.5			7.5		ns
Gain 2[2]			6.0	10		6.0	10	ns
Input resistance								
Gain 1[1]			4.0			4.0		kΩ
Gain 2[2]		10	30		20	30		kΩ
Input capacitance[2]	Gain 2		2.0			2.0		pF
Input offset current			0.4	5.0		0.4	3.0	μA
Input bias current			9.0	30		9.0	20	μA
Input noise voltage	BW 1kHz to 10kHz		12			12		μVrms
Input voltage range				±1.0			±1.0	V
Common mode rejection ratio								
Gain 2	VCM ±1V,F < 100kHz	60	86		60	86		dB
Gain 2	VCM ±1V,F = 5MHz		60			60		dB
Supply voltage rejection ratio								
Gain 2	ΔVS = ±0.5V	50	70		50	70		dB
Output offset voltage								
Gain 3[3]	$R_L = \infty$		0.35	0.75		0.35	0.75	V
Output common mode voltage	$R_L = \infty$	2.4	2.9	3.4	2.4	2.9	3.4	V
Ouptut voltage swing	$R_L = 2K$	3.0	4.0		3.0	4.0		
Ouput resistance			20			20		Ω
Power supply current	$R_L = \infty$		18	24		18	24	mA

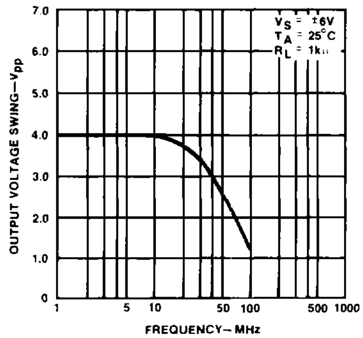
NOTES
1. Gain select pins G_{1A} and G_{1B} connected together
2. Gain select pins G_{2A} and G_{2B} connected together.
3. All gain select pins open

TYPICAL PERFORMANCE CHARACTERISTICS

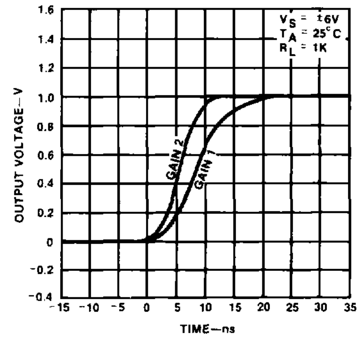
COMMON MODE REJECTION RATIO AS A FUNCTION OF FREQUENCY



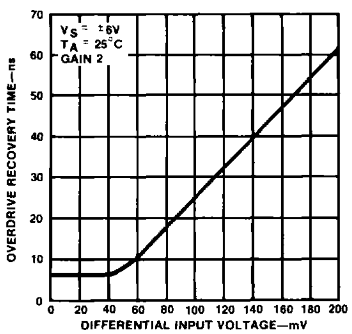
OUTPUT VOLTAGE SWING AS A FUNCTION OF FREQUENCY



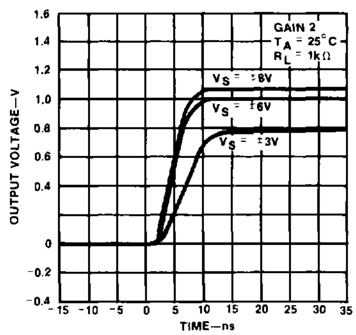
PULSE RESPONSE



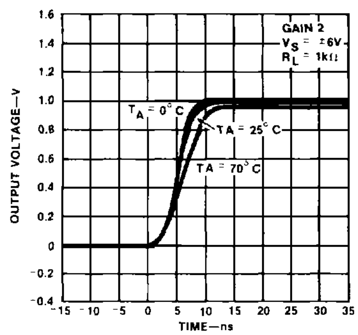
DIFFERENTIAL OVERDRIVE RECOVERY TIME



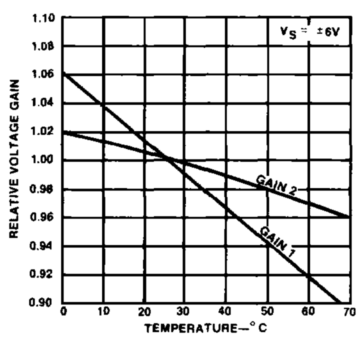
PULSE RESPONSE AS A FUNCTION OF SUPPLY VOLTAGE



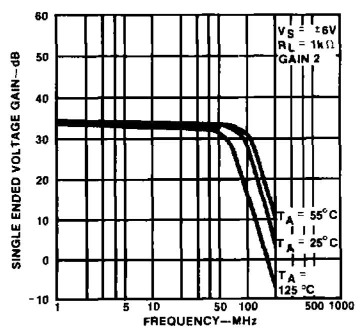
PULSE RESPONSE AS A FUNCTION OF TEMPERATURE



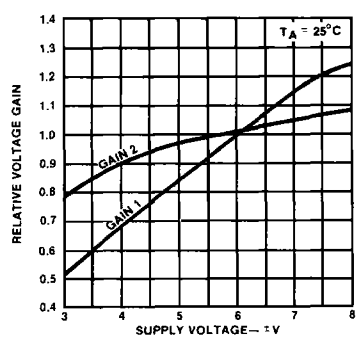
VOLTAGE GAIN AS A FUNCTION OF TEMPERATURE



GAIN vs FREQUENCY AS A FUNCTION OF TEMPERATURE

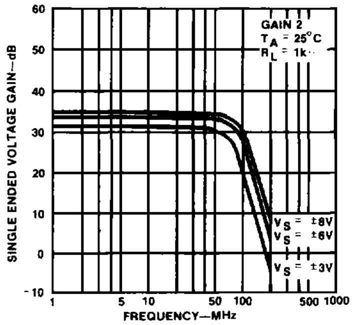


VOLTAGE GAIN AS A FUNCTION OF SUPPLY VOLTAGE

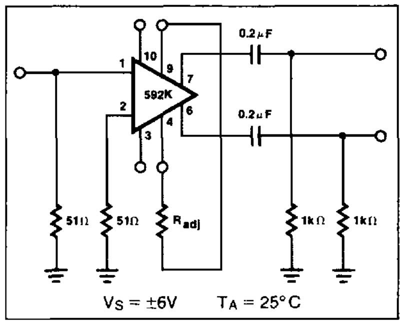


TYPICAL PERFORMANCE CHARACTERISTICS (Cont'd)

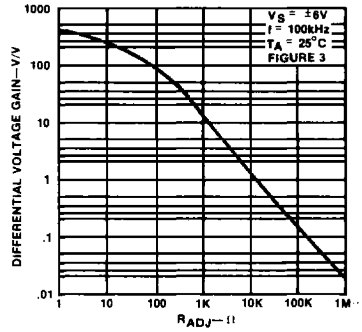
GAIN vs FREQUENCY AS A FUNCTION OF SUPPLY VOLTAGE



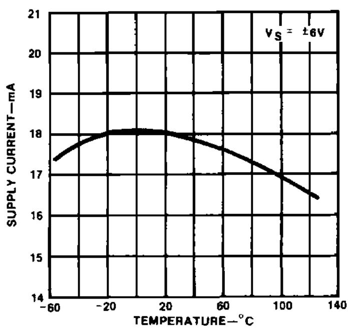
VOLTAGE GAIN ADJUST CIRCUIT



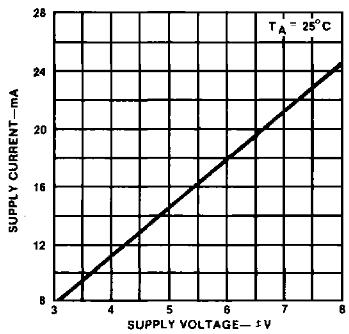
VOLTAGE GAIN AS A FUNCTION OF RADJ (FIGURE 3)



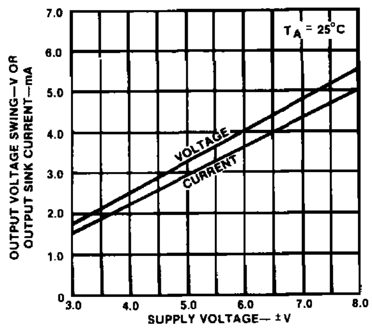
SUPPLY CURRENT AS A FUNCTION OF TEMPERATURE



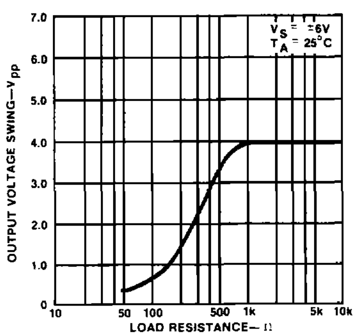
SUPPLY CURRENT AS A FUNCTION OF SUPPLY VOLTAGE



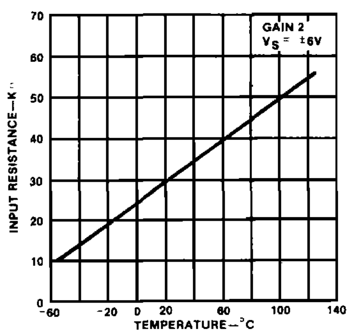
OUTPUT VOLTAGE AND CURRENT SWING AS A FUNCTION OF SUPPLY VOLTAGE



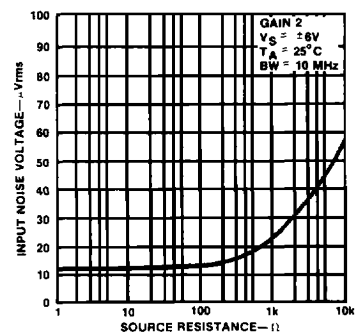
OUTPUT VOLTAGE SWING AS A FUNCTION OF LOAD RESISTANCE



INPUT RESISTANCE AS A FUNCTION OF TEMPERATURE



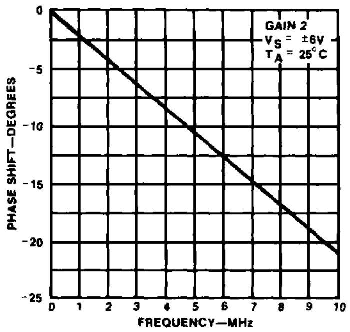
INPUT NOISE VOLTAGE AS A FUNCTION OF SOURCE RESISTANCE



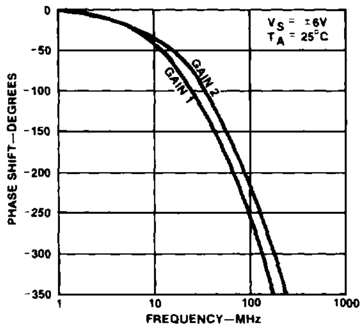
NE/SE592-F,K,N

TYPICAL PERFORMANCE CHARACTERISTICS (Cont'd)

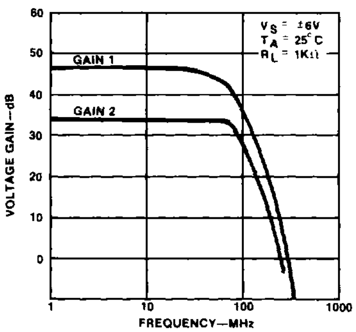
PHASE SHIFT AS A FUNCTION OF FREQUENCY



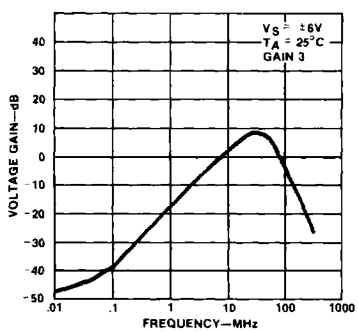
PHASE SHIFT AS A FUNCTION OF FREQUENCY



VOLTAGE GAIN AS A FUNCTION OF FREQUENCY

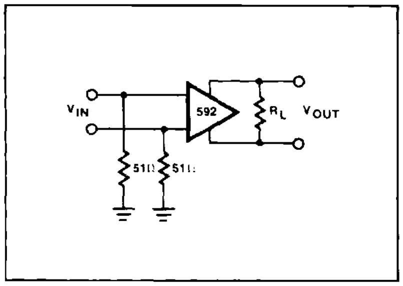


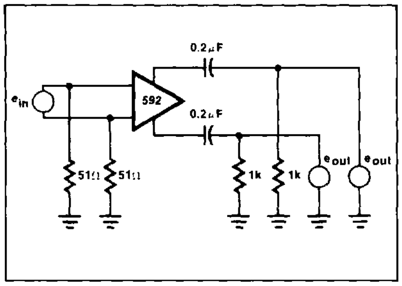
VOLTAGE GAIN AS A FUNCTION OF FREQUENCY (ALL GAIN SELECT PINS OPEN)



TEST CIRCUITS

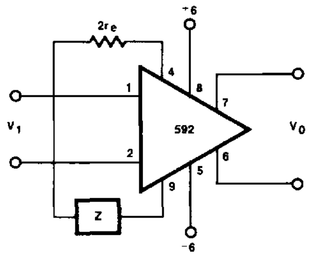
T_A = 25°C unless otherwise specified





TYPICAL APPLICATIONS

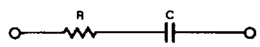
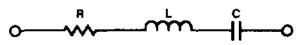
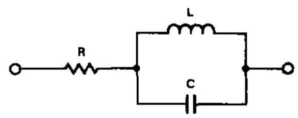
FILTER NETWORKS



$$\frac{V_0(s)}{V_1(s)} \cong \frac{1.4 \times 10^4}{Z(s) + 2r_e}$$

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

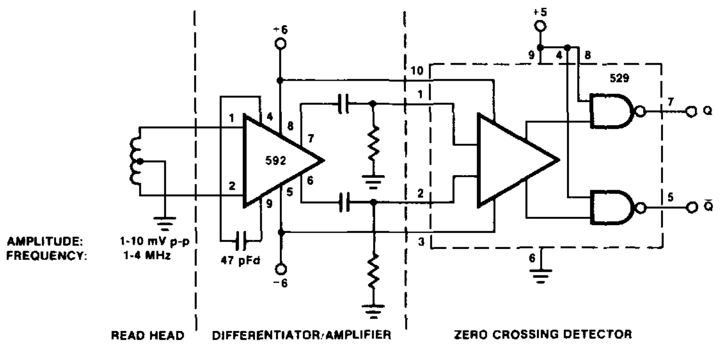
BASIC CONFIGURATION

Z NETWORK	FILTER TYPE	$\frac{V_0(s)}{V_1(s)}$ 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	$\frac{1.4 \times 10^4}{L}\left[\frac{s}{s^2 + R/L\, s + 1/LC}\right]$
	BAND REJECT	$\frac{1.4 \times 10^4}{R}\left[\frac{s^2 + 1/LC}{s^2 + 1/LC + s/RC}\right]$

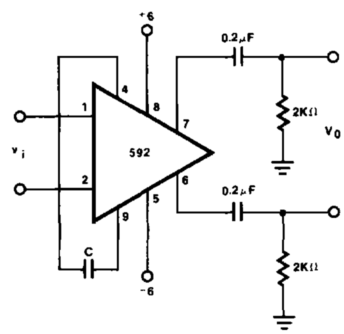
NOTE

In the networks above, the R value used is assumed to include $2r_e$, or approximately 32Ω.

DISC/TAPE PHASE MODULATED READBACK SYSTEMS



DIFFERENTIATION WITH HIGH COMMON MODE NOISE REJECTION



FOR FREQUENCY $F_1 \ll 1/2\pi(32)C$

$V_0 \cong 1.4 \times 10^4 C \frac{dV_i}{dT}$