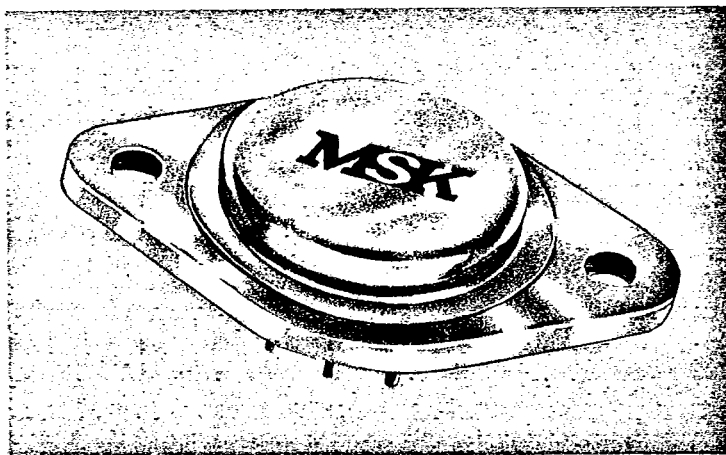


MSK

HIGH FREQUENCY, HIGH SLEW RATE FET DIFFERENTIAL HYBRID AMPLIFIERS

Models 850/860/870/880/890

- 1000 V/ μ Sec.
- 100 MHz Bandwidth
- 50 nSec. Settling to 1%
- 85 nSec. Settling to .1%
- 125 mA Steady state output current
- -55°C to +125°C Operating temperature range
- -65°C to +150°C Storage
- Short circuit protected



Model

Characteristics

850	Designed for driving coax 50/100 Ω systems.
860	Optimized for fast settling and pulse applications.
870	Optimized for high frequency summation/subtraction.
880	Designed for maximum full power output.
890	Optimized for high CMV and CMRR.

M. S. Kennedy Corp.

Pickard Drive

Syracuse, New York 13211 Tel. 455-7077

00850-1x

Electrical Specifications

Voltage Gain	10,000 min	Common Mode Input Impedance	10 ⁹ min
Rated Output Voltage	±10V min	Input Capacitance	4PF.
Input Bias Current	200 PA max	Max Safe differential Voltage	±15 VDC
Input Bias Current Drift	Doubles Every 10°C	Power Supply	± 15 VDC ± 2%
Input Voltage Drift Co-efficient	50 μV/°C Typ, 100 μV/°C Max.	Operating Temperature Range	-55°C to 125°C
Initial Offset	(Adjustable to 0)	Storage Temperature Range	-65°C to 150°C

PARAMETER	UNITS	850	860	870	880	890
Full power output	MHz	10 min	8 min	10 min	15 min	8 min
Slew rate	V/μSec	630 min	500 min	630 min	1000 min	500 min
Bandwidth	MHz	85 min	80 min	100 min	80 min	80 min
CMV range	V	±6 min	±6 min	±6 min	±6 min	±10 min
CMRR	dB	60 min	60 min	60 min	60 min	*80 min
Settling time to 1%	nSec	_____	50 max	_____	_____	_____
Settling time to .1%	nSec	_____	85 max	_____	_____	_____
Rated output current	mA	125 min	80 min	80 min	80 min	80 min
Quiescent current	mA	±50 max	±50 max	±50 max	±55 max	±50 max

*80dB ± 5VDC, 60dB ± 10VDC

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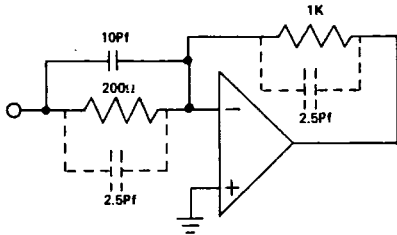
APPLICATIONS INFORMATION

Amplifiers under Gain:

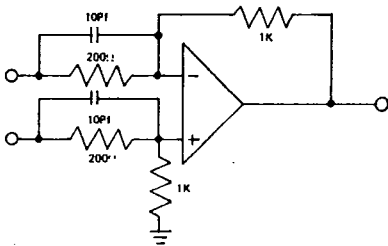
When committing the amplifier to gain, do not overlook the capacitance of the resistors used. The capacitance of resistors within the same family tends to be the same.

This means if you have committed your amplifier to a gain of 5 and have overlooked the capacitance, you will be experiencing roll-off sooner than expected due to the equalized capacitance.

If you want the full capability of the amplifier, you must commit the impedance to a gain of five.



Equally important in using a differential amplifier is to make sure that the impedances from both input ports is equalized.



Load Considerations:

When determining the load the amplifier will see, the capacitive portion must be taken into consideration. For an amplifier which slews at 1000 V/μ sec., each pf will require 1 mA of output current.

Input Impedance:

The shunt input capacitance of these amplifiers can effect the response if the Input and Feedback Impedance is too high.

Power Supply Decoupling:

Proper decoupling of the power supply lines is extremely important. Since these amplifiers are very wide band devices, the self resonant frequency established by the capacitor value and the pc land lengths must be considered.

The recommended localized coupling for these amplifiers is a parallel grouping of the .01 uf, and 5 uf; with the .01 uf capacitor being located as close to the power pins as possible.

Effect of 3pf Input Capacitance

vs.

Input Resistance at 10 MHz

Resistance	Phase Shift	Amplitude Attenuation
100 ohms	1°	----
500 ohms	5.4°	.43%
1K	10.5°	1.7%
2K	20°	6%
5K	43°	27%

DEFINITION OF TERMS:

Slew Rate:

$S=2\pi fV_p$; Slew rate is based upon the sinusoidal linear response of the amplifier and is calculated from the full power output frequency.

Slew Rate Limit:

dv/dt; The slew rate limit is based upon the amplifier's response to a step input and is measured between 10% and 90%.

Bandwidth:

The bandwidth of the amplifier is the unity gain crossover point.

Gain Bandwidth Product:

The gain bandwidth is measured at the full power output frequency and is the multiplication of full power output X the open loop gain at that frequency.

Settling Time:

The time required for the output to come within a pre-determined error band after the application of a full scale step input. This includes the amplifier time delay and slew time.

Full Power Output:

The maximum frequency at which the amplifier can drive it's rated load.

Useful Approximations:

Settling Time (t_s) of a Succession of Poles:

$$t_s = \sqrt{x^2 + y^2 + z^2} \dots$$

Where x, y, z, etc. represent the settling times of each independent element in the system under test

Settling Time to 1% $\approx 5RC$
 0.1% $\approx 7RC$
 0.01% $\approx 10RC$

Rise Time (T_r): $T_r = \frac{.35}{f}$, where f = bandwidth

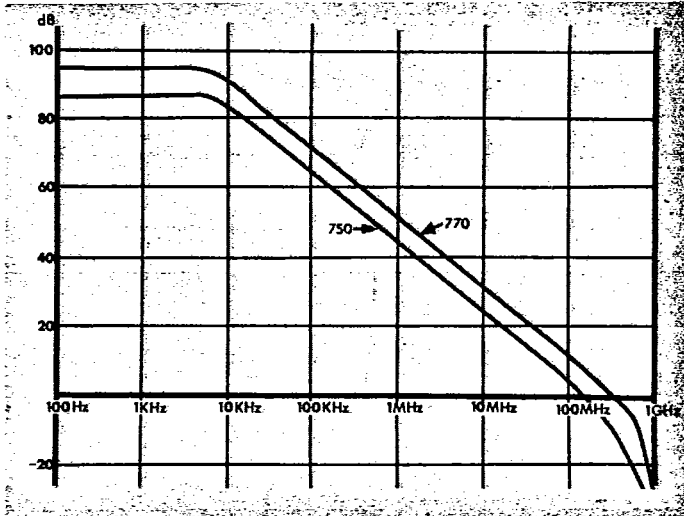
$$T_r \approx 2.2 RC, \text{ where } RC = \text{time constant}$$

$$2\pi f = \omega = 2T_r$$

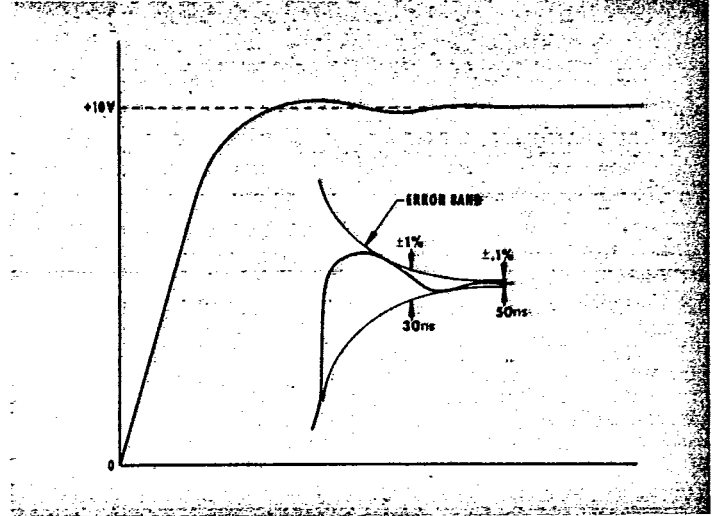
DECIBEL CONVERSION TABLE

dB	Voltage Ratio	dB	Voltage Ratio
+3	1.41	-3	.707
+6	2	-6	.5
+12	4	-12	.25
+20	10	-20	.1
+40	100	-40	.01

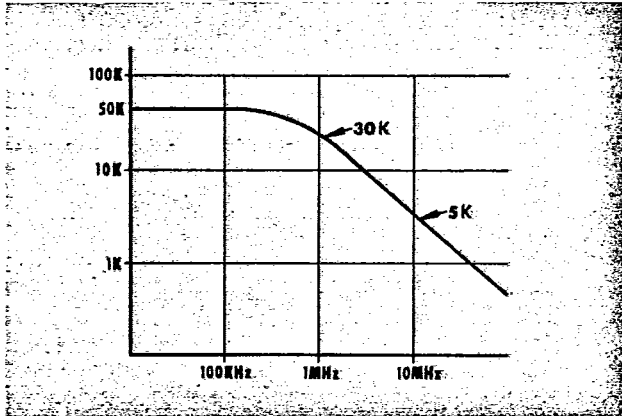
OPEN LOOP GAIN PLOTS



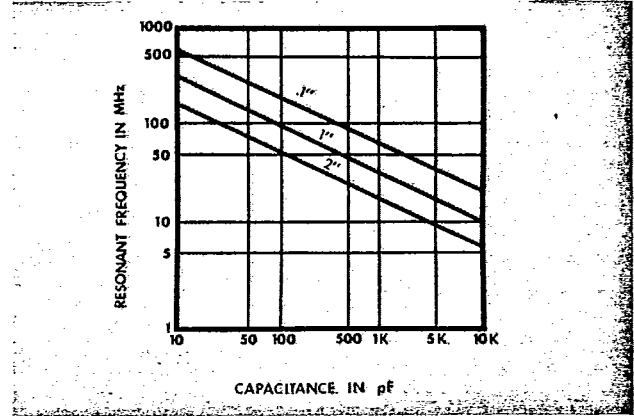
SETTLING TIME RESPONSE



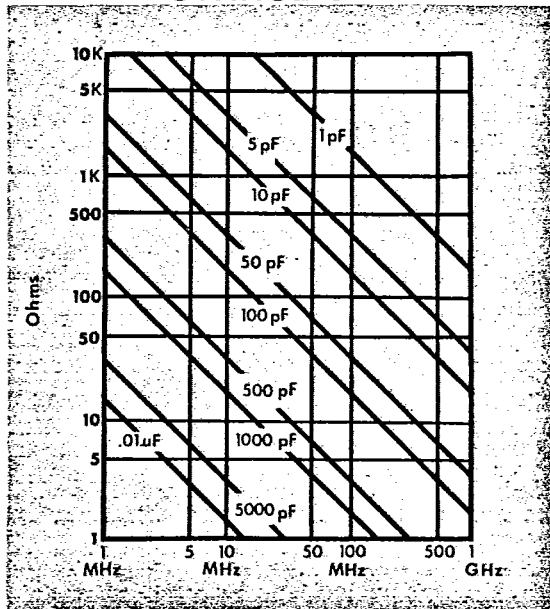
INPUT IMPEDANCE



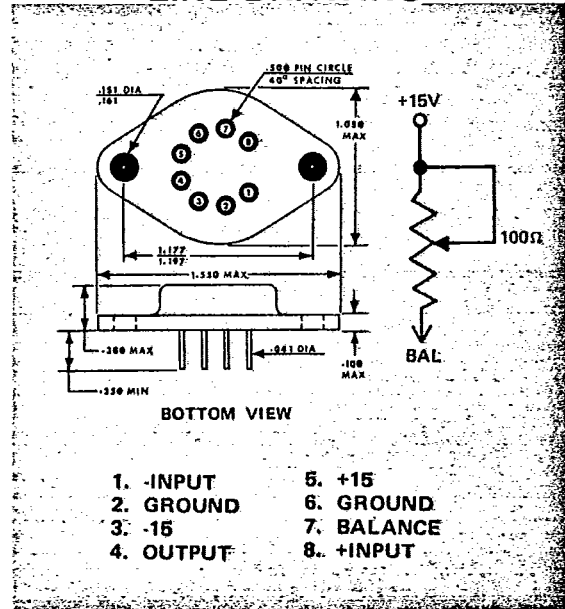
CAPACITOR RESONANCE



REACTANCE CHART



LINE DRAWING



- | | |
|-----------|------------|
| 1. -INPUT | 5. +15 |
| 2. GROUND | 6. GROUND |
| 3. -15 | 7. BALANCE |
| 4. OUTPUT | 8. +INPUT |

Price 1-9 \$125.00 10-24 \$115.00

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