

MSK

Product Specifications
and Price Information



High Frequency, High Slew Rate Hybrid Amplifiers

Models 750, 760, 770, 780

Features:

- 2000 V/ μ Sec.
- 200 MHz Bandwidth
- 30 nSec. Settling to 1%
- 50 nSec. Settling to .1%
- 125 mA Steady State Output Current
- -55° C to +125° C Operating Temperature Range
- Short Circuit Protected

**MSK**

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High Frequency, High Slew Rate Hybrid Amplifiers

Models 750, 760, 770, 780

Characteristics:

750 Designed specifically for driving coax lines.

760 Optimized for fast settling and pulse applications.

770 Optimized for high frequency summation.

780 Designed for maximum full power output.

Electrical Specifications at 25° C

Parameter	Units	750	760	770	780
Voltage gain	V/V	20,000 min	20,000 min	40,000 min	40,000 min
Full power output	MHz	20 min	15 min	20 min	30 min
Settling time to 1%	nSec.	—	30 max	—	—
Settling time to .1%	nSec.	—	50 max	—	—
Bandwidth	MHz	125 min	—	—	120 min
Gain—bandwidth product	MHz	—	—	200 min	—
Slew rate	V/ μ Sec.	1,300 min	—	1,300 min	2,000 min
Slew rate limit	V/ μ Sec.	—	1,300 min	—	—
Rated output voltage	Volts	± 10 min	± 10 min	± 10 min	± 10 min
Rated output current	mA	125 min	100 min	80 min	80 min
Output surge current	mA	175 min	125 min	—	—
Input voltage drift coefficient	μ V/ $^{\circ}$ C	25 max	25 max	25 max	25 max
Input bias current	nA	200 max	200 max	200 max	200 max

Operating Temp. Range -55° C to $+125^{\circ}$ C

Storage -65° C to $+150^{\circ}$ C

Short Circuit Protected

Input Circuit Drift Coefficient $3\text{nA}/^{\circ}$ C

Input Capacitance 3 typ 4 max

DC Input Impedance 50K ohms

Balance Trimpot — 50K ohms

Power Supplies — ± 15 volts

(available for use with ± 12 Volt Supplies)

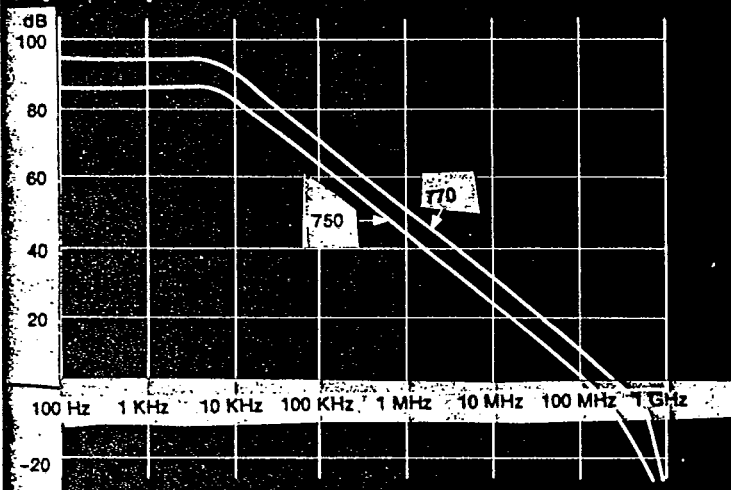
Quiescent Current — 35 mA

Developed for use in airborne radar and display systems.

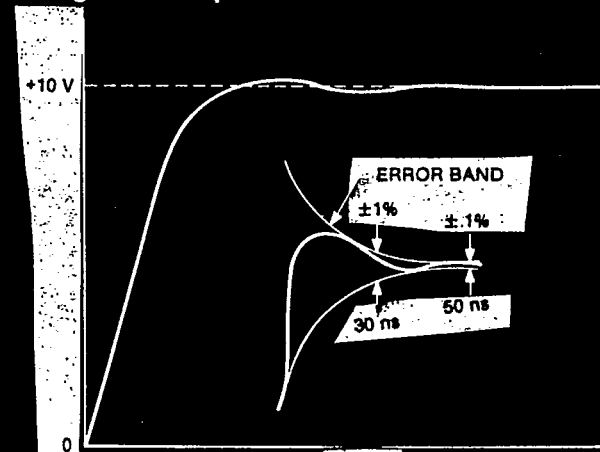
Manufactured in accordance with MIL. Std. — 883/B.

Performance Specifications — Typical Circuit

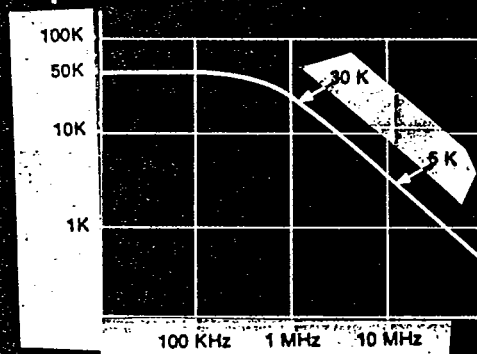
Open Loop Gain Plots



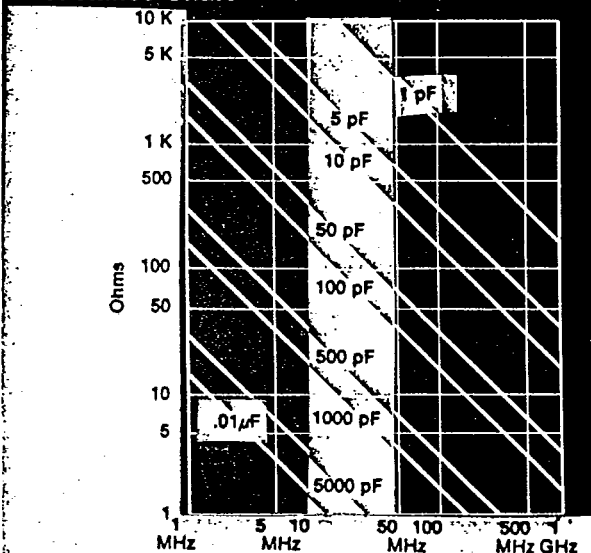
Settling Time Response



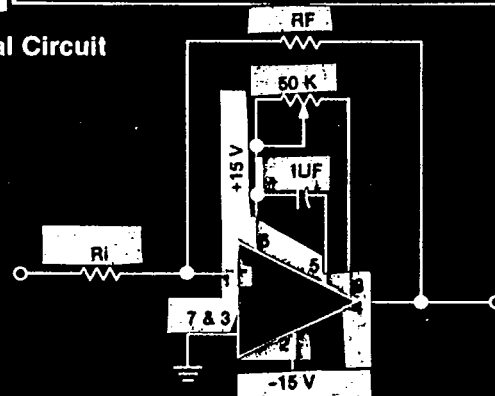
Input Impedance



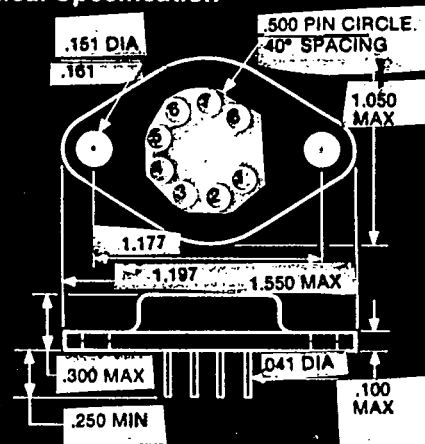
Reactance Chart



Typical Circuit



Mechanical Specification



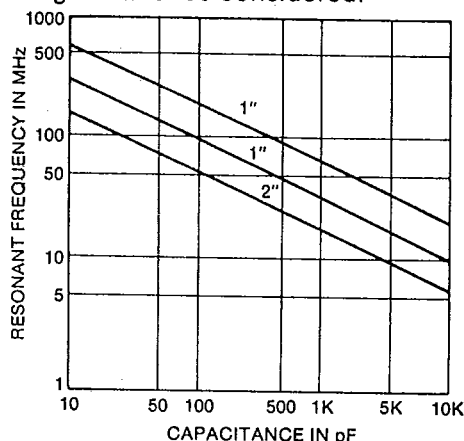
Bottom View

- | | |
|--------------|-----------------------|
| 1. Input | 5. Compensation Point |
| 2. -15 Volts | 6. +15 Volts |
| 3. Ground | 7. Ground |
| 4. Output | 8. Balance |

Applications Information

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 decoupling for these amplifiers is a parallel grouping of 100 pf, .01 uf, and 1 uf; with the 100 pf capacitor being located as close to the amplifier's power pins as possible.

Load Considerations

When determining the load the amplifier will see, the capacitive portion must be taken into consideration. For an amplifier which slews at 2000 V/ μ sec., each pf will require 2 mA of output current. Connecting a 10X oscilloscope probe to the output of the amplifier can place a 40 mA capacitive load current demand on the amplifier. A 1X probe can require as much as 130 mA.

Input Impedance:

These amplifiers are designed for low input capacitance to minimize insertion loss. However, the 3 to 4

pf which does exist must be taken into consideration to avoid bandwidth limitation at the input. To obtain the best results, we recommend that you not go above a 1K impedance level.

Effect of 3 pf 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 predetermined 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% $\approx 5 RC$
 0.1% $\approx 7 RC$
 0.01% $\approx 10 RC$

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

$T_r \approx 2.2 RC$, where RC = time constant
 $2\pi f = \omega \approx 2 T_r$

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

Prices

Models 750, 760, 770, 780

Qty. 1 — 24

Commercial — \$98.00

Military — \$160.00
 (Mil. Std. 883 Level B)

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