MSK

300 Series Buffer Amplifiers Models 320, 330, 350, 360

- 3000 V/μS Slew Rate
- $\pm$ Volts Output @200 mA
- 200 MHz Bandwidth
- 0.999 Voltage Gain @Dc
- -55°C to 125°C Temperature Range

M.S. Kennedy Corporation
8170 Thompson Road
Clay, New York 13041
Phone: (315) 699-9201

Model 320

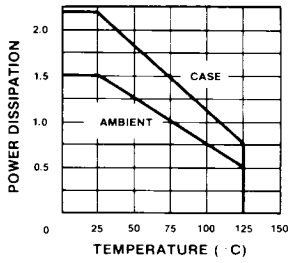
- 2000 v/μ sec. Slew Rate
- 150 MHz Bandwidth

ELECTRICAL SPECIFICATIONS

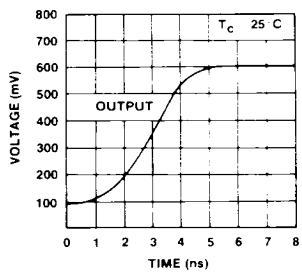
PARAMETER	MIN	TYP	MAX	UNITS
Offset Voltage		5	25	mV
Temperature Coefficient of Offset Voltage		50	200	μV/° C
Input Bias Current		5	25	uA
Voltage Gain R_L = 1K	.98	.99		v/v
Input Resistance	50K	100K		Ω
Input Capacitance		8	10	pf
Output Impedance		3	6	Ω
Output Current	50			mA
Output Voltage	±11	±13		Volts
Quiescent Current		20	25	mA
Slew Rate R_L = 100 Ω	1000	2000		V/μ Sec
Full Power Output	10	15		MHz
Bandwidth —3 db	100	150		MHz
1% Settling Time		30	50	nSec
.1% Settling Time		50	75	nSec
Power Supply Voltage		±15	±18	Volts
Operating Temperature Range	Commercial Military - B	—25° C to +85° C —55° C to +125° C (case)		
Storage Temperature Range		—65° C to +150° C		

TYPICAL PERFORMANCE CHARACTERISTICS

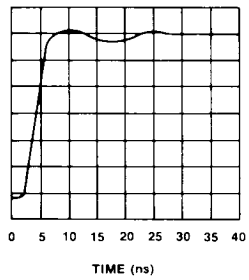
To-8 POWER DISSIPATION



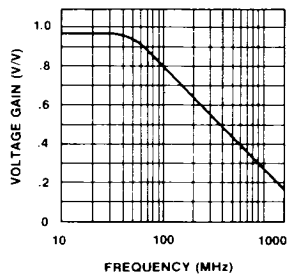
SMALL SIGNAL RISE TIME



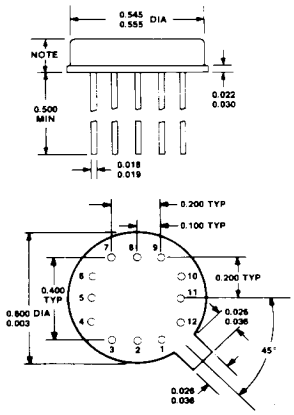
PULSE RESPONSE 10 VOLT STEP



FREQUENCY RESPONSE



MECHANICAL SPECIFICATIONS



To-8 BOTTOM VIEW

PIN ASSIGNMENT	
PIN	DESG.
1	—Vc
2	OUTPUT
3	+Vc
4	+Vcc
5	NC
6	CASE
7	NC
8	INPUT
9	NC
10	NC
11	NC
12	—Vcc

NC—No Connection

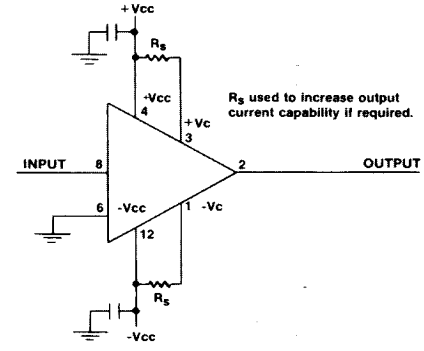
NOTE: Commercial cover height .150 max.
Military cover .270

APPLICATIONS

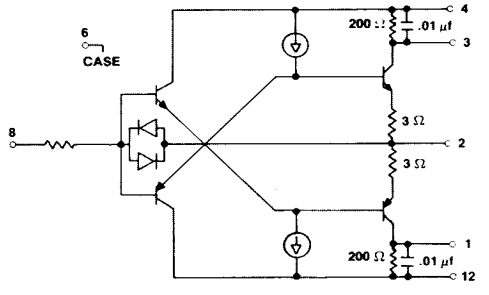
The MSK 320 is an open loop buffer capable of driving capacitive loads without susceptibility to oscillation. However, keep in mind that at 2000 V/μ S each picofarad of load capacitance requires two milliamps to drive it. Power dissipation resulting from driving capacitive loads plus quiescient power must be kept below total package power rating. To minimize ringing with highly capacitive loads, reduce the load time constant by adding shunt resistance.

Short circuit protection is provided by the 200Ω resistors in the output transistor collector circuits. The addition of the .01 μf shunt capacitors helps to retain full output swing for transient pulses. Short circuit protection can be defeated simply by shorting pin 3 to 4 and pin I to I2.

TYPICAL CIRCUIT 320



SCHEMATIC 320



PRICES

MSK320

1-24 Piece Pricing

320	$26.00
320B	$49.00

'B' suffix indicates MIL. STD. 883 Level 'B' Processing, Method 5008.

Model 330

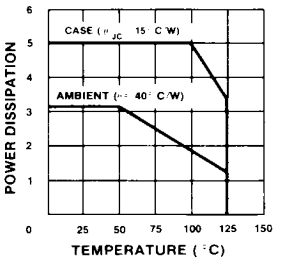
- 2000 v/μ sec. Slew Rate
- 200 MHz Bandwidth

ELECTRICAL SPECIFICATIONS

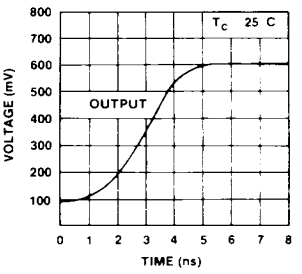
PARAMETER	MIN	TYP	MAX	UNITS
Offset Voltage		5	25	mV
Temperature Coefficient of Offset Voltage		50	200	μV/° C
Input Bias Current		5	25	uA
Voltage Gain R_L= 1K R_L= 100Ω	 .98 .95	 .99 .97		 v/v v/v
Input Resistance	50K	100K		Ω
Input Capacitance		8	10	pf
Output Impedance		2	4	Ω
Output Current	100	200		mA
Output Voltage	±11	±13		Volts
Quiescent Current		30	40	mA
Power Consumption		.9	1.2	Watts
Slew Rate R_L= 100Ω	2000	3000		V/μSec
Full Power Output	30	40		MHz
Bandwidth—3db	150	200		MHz
1% Settling Time		15	30	nSec
.1% Settling Time		30	50	nSec
Power Supply Voltage		±15	±18	Volts
Operating Temperature Range	Commercial Military - B	—25° C to +85° C —55° C to +125° C (case)		
Storage Temperature Range		—65° C to +150° C		

TYPICAL PERFORMANCE CHARACTERISTICS

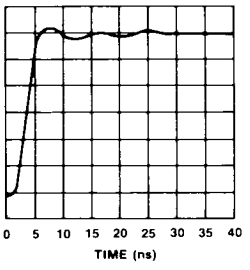
To-3 POWER DISSIPATION



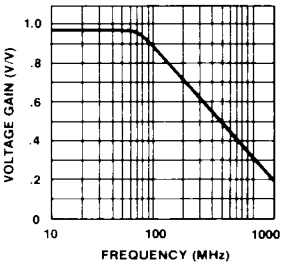
SMALL SIGNAL RISE TIME



PULSE RESPONSE 10 VOLT STEP

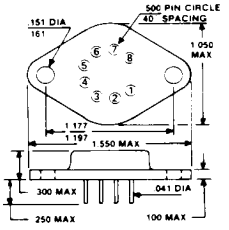


FREQUENCY RESPONSE



MECHANICAL SPECIFICATIONS

To -3 BOTTOM VIEW



Pin compatible with LH0063.

PIN ASSIGNMENT	
PIN	DESG.
1	+Vc
2	+Vcc
3	OUTPUT
4	INPUT
5	NC
6	NC
7	—Vcc
8	—Vc

NC—No Connection

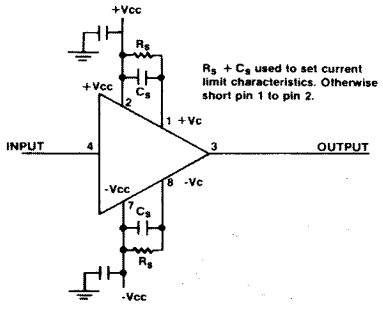
APPLICATIONS

Like the 320, the 330 is an open loop buffer capable of high speed at high power levels. In order to utilize the full drive capabilities of both devices, each should be mounted with the appropriate heat sink especially when operated over the full military temperature range.

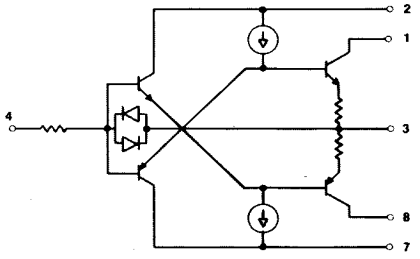
For short circuit protection either a resistive scheme (similar to that on the 320), or a "saturated current source" type of active limiter may be used.

Power supply bypassing is required for flat frequency response, fast settling time and in the prevention of oscillation for all three buffers under all loading conditions. Capacitors should be low inductance ceramic with short lead lengths mounted closely to the amplifier. As a rule of thumb, chose a .01 μf ceramic and a 4.7 μf solid tantalum for each supply line; double up this combination for heavy loading.

TYPICAL CIRCUIT 330



SCHEMATIC 330



PRICES

MSK330

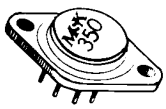
1-24 Piece Pricing

330	$30.00.
330B	$60.00

'B' suffix indicates MIL. STD. 883 Level 'B' Processing, Method 5008.

Model 350/360

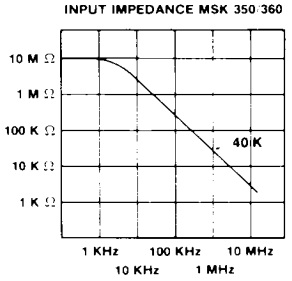
- 100 MHz Bandwidth
- .9990 Min. Voltage Gain



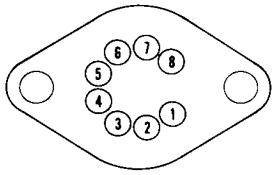
ELECTRICAL SPECIFICATIONS

PARAMETERS	UNITS	350	360
Voltage Gain @ DC	V/V	0.9990 min.	0.9990 min.
Full power output	MHz	20	—
Settling time to 1%	nSec	—	15 typ., 25 max.
Settling time to 0.1%	nSec	—	25 typ., 50 max.
Bandwidth—3 db	MHz	100	100
Slew rate	V/μS	1300 (linear)	2000 (pulsed)
Time delay	nSec	1 typ., 2.5 max.	1 typ., 2.5 max.
Rated output voltage	V	±10	±10
Rated output current	mA	125	100
Input bias current	μA	3 max.	3 max.
Input offset voltage	V	Adjustable to 0	Adjustable to 0
Input impedance	MΩ	10 min.	10 min.
Input capacitance	pf	4	4
Output impedance	Ω	.1 (DC max.)	.1 (DC max.)
Supply voltage	V	±15	±15
Quiescent current	mA	50 typ., 65 max.	50 typ., 65 max.
Operating temp. range		—55° C to +125° C	—55° C to +125° C
Storage temp. range		—65° C to +150° C	—65° C to +150° C

TYPICAL PERFORMANCE CHARACTERISTICS



MECHANICAL SPECIFICATIONS



BOTTOM VIEW

PIN ASSIGNMENT	
PIN	DESG.
1	INPUT
2	GROUND
3	—15 V
4	NC
5	OUT
6	+15 V
7	GROUND
8	BALANCE

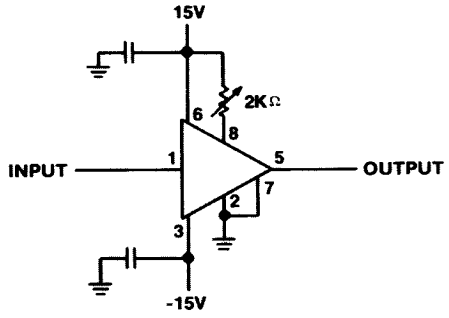
NC—No Connection

APPLICATIONS

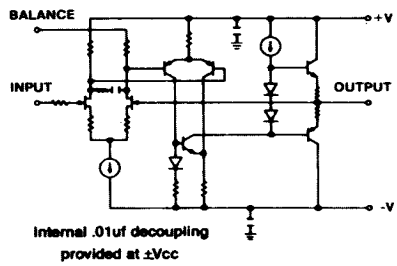
The 350 Series Amplifiers are non-inverting, closed loop, unit gain amplifiers. The Model 350 is optimized for linear applications while the Model 360 is optimized for pulse applications. These amplifiers find applications as Buffer Amplifiers for driving coax lines; sample and hold or track and hold applications; and Distribution Amplifiers.

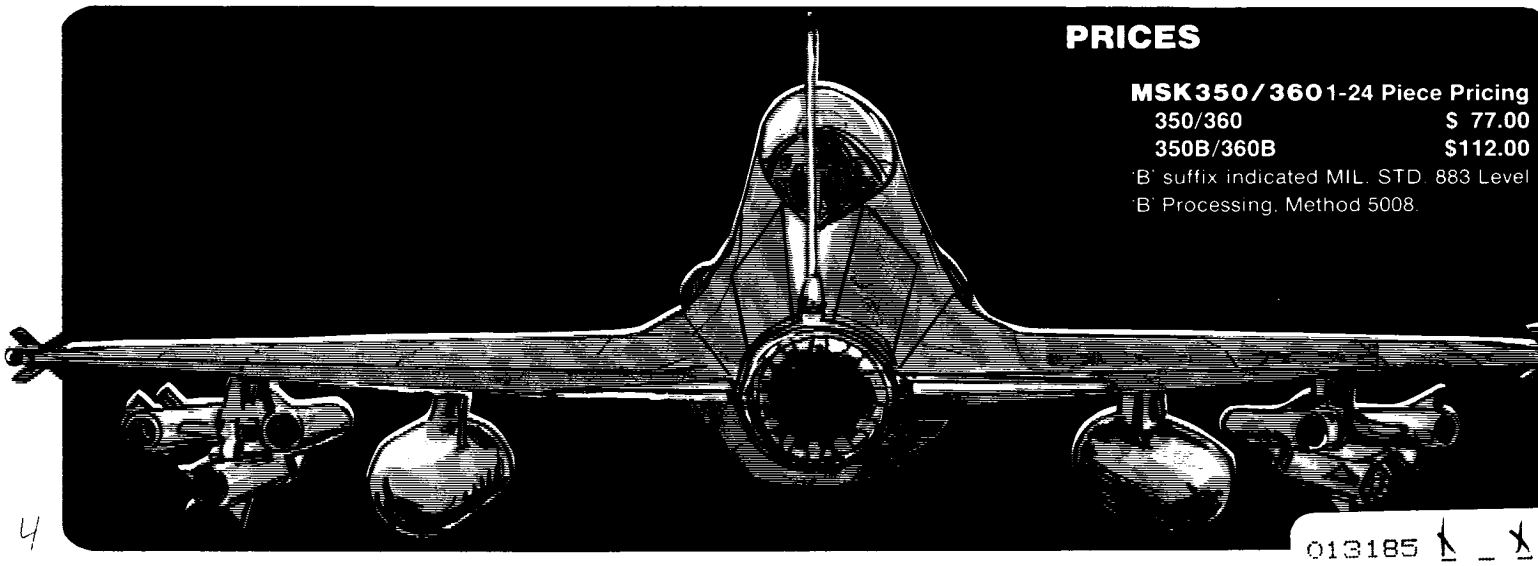
Because these are non-inverting amplifiers, caution must be taken to insure that the output signal line does not couple to the input as the amplifier would experience positive feedback and oscillate. To insure against positive feedback a ground plane should exist between the input and output runs on the printed circuit card and coax lines should be used on any input or output line off the printed circuit card

TYPICAL CIRCUIT 350/360



SCHEMATIC 350/360





PRICES

MSK350/360 1-24 Piece Pricing

350/360	$ 77.00
350B/360B	$112.00

'B' suffix indicated MIL. STD. 883 Level 'B' Processing. Method 5008.

4

013185