Am102/202/302

Voltage Follower

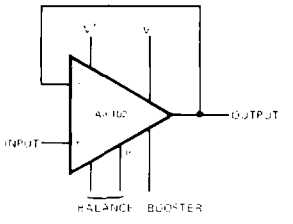
Distinctive Characteristics

- The Am102/202/302 are functionally, electrically, and pin-for-pin equivalent to the National LM102/202/302
- Slew rate: 20V/μs
- Small signal bandwidth: 20MHz
- Input current: 100nA max. over temperature
- Supply voltage range: ±5.0V to ±18V
- 100% reliability assurance testing in compliance with MIL-STD-883
- Electrically tested and optically inspected dice for hybrid manufacturers
- Available in metal can, hermetic dual-in-line or hermetic flat packages

FUNCTIONAL DESCRIPTION

The Am102/202/302 is a monolithic Operational Amplifier internally connected as a unity gain non-inverting amplifier. This circuit is ideal for such applications as fast sample and hold circuits, active filters, or as a general purpose buffer. Super-beta transistors are used allowing the devices to operate at very low input currents without sacrificing speed. It may be used to replace conventional op amps such as 101 and the 741 in voltage follower applications, where lower offset voltage, drift, bias current, noise, plus higher speed and a wider operating voltage range is desirable.

FUNCTIONAL DIAGRAM



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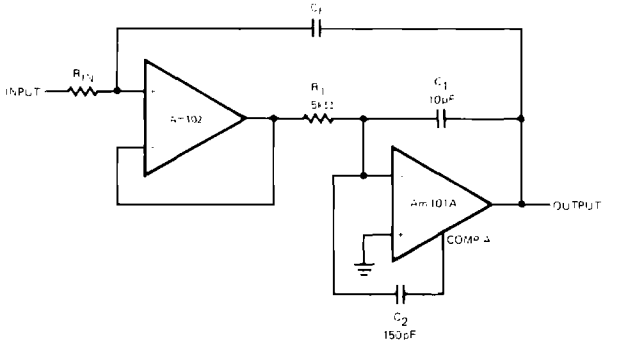
TYPICAL APPLICATION

Fast Integrator With Low-Input Current



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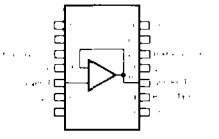
ORDERING INFORMATION

Part Number	Package Type	Temperature Range	Order Number
Am302	TO-99	0°C to +70°C	LM302H
	Hermetic DIP	0°C to +70°C	LM302D
	Dice	0°C to +70°C	LD302
Am202	TO-99	-25°C to +85°C	LM202H
	Hermetic DIP	-25°C to +85°C	LM202D
Am102	TO-99	-55°C to +125°C	LM102H
	Hermetic DIP	-55°C to +125°C	LM102D
	Flat Pak	-55°C to +125°C	LM102F
	Dice	-55°C to +125°C	LD102

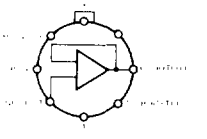
CONNECTION DIAGRAMS

Top Views

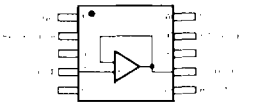
Dual-In-Line



Metal Can



Flat Package



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NOTES:

(1) On Metal Can, pin 4 is connected to case.

(2) On DIP, pin 6 is connected to bottom of package.

(3) On Flat Package, pin 5 is connected to bottom of package.

MAXIMUM RATINGS

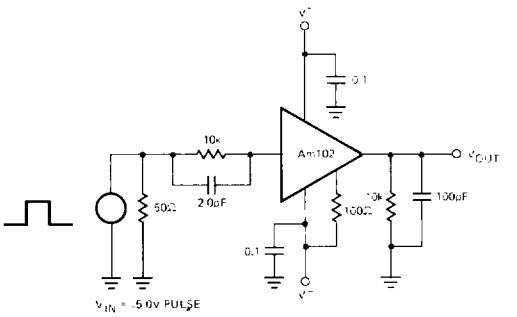
Supply Voltage	±18V
Internal Power Dissipation (Note 1)	500mW
Input Voltage (Note 2)	±15V
Output Short-Circuit Duration (Note 3)	Indefinite
Operating Temperature Range	
Am102	−55°C to +125°C
Am202	−25°C to + 85°C
Am302	0°C to + 70°C
Storage Temperature Range	−65°C to +150°C
Lead Temperature (soldering, 60 sec)	300°C

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise specified) (Note 4)

Parameter (see definitions)	Conditions	Am302 Min.	Am302 Typ.	Am302 Max.	Am102 Am202 Min.	Am102 Am202 Typ.	Am102 Am202 Max.	Units
Input Offset Voltage			2.5	15		2.0	5.0	mV
Input Bias Current			2.0	30		3.0	10	nA
Input Resistance		10^3	10^6		10^4	10^6		MΩ
Input Capacitance			1.5			1.5		pF
Large-Signal Voltage Gain	R_L = 8.0kΩ, V_{OUT} = ±10V, V_S = ±15V	0.9985	0.9995		0.999	0.9996		V/V
Output Resistance			0.75	2.5		0.8	2.5	Ω
Supply Current			3.9	5.5		3.9	5.5	mA
Slew Rate	V_S = ±15V, V_{IN} = ±10V, R_L = 10kΩ		20			20		V/μs
The Following Specifications Apply Over The Operating Temperature Range								
Input Offset Voltage				10.0			7.5	mV
Input Bias Current				10.0		30	100	nA
Large-Signal Voltage Gain	R_L = 10kΩ, V_{OUT} = +10V, V_S = ±15V	0.9985			0.999			V/V
Output Voltage Swing (Note 5)	R_L = 10kΩ, V_S = ±15V	±10			±10			V
Supply Current	T_A = +125°C					2.0	4.0	mA
Supply Voltage Rejection Ratio	±5.0V ≤ V_S ≤ ±18V	60			70			dB
Average Temperature Coefficient of Input Offset Voltage	0°C ≤ T_A ≤ +70°C		20					μV/°C
	−55°C ≤ T_A ≤ +85°C					6.0		μV/°C
	+85°C ≤ T_A ≤ +125°C					12		μV/°C

Notes:
1. Derate Metal Can package 6.8mW/°C for operation at ambient temperatures above 75°C, the Dual-In-Line at 9.0mW/°C for operation at ambient temperatures above 95°C, and the Flat Packages at 5.4mW/°C for operation at ambient temperatures above 57°C.
2. For supply voltages less than ±15V, the maximum input voltage is equal to the supply voltage.
3. To prevent damage when the output is shorted, it is necessary to insert a resistor larger than 2.0kΩ in series with the input. Continuous short circuit is allowed for case temperatures to +125°C and ambient temperatures to +70°C for the 102/202. For 302, the corresponding temperatures are +70°C and +55°C respectively.
4. Unless otherwise specified, these specifications apply for supply voltages from ±5.0V to ±18V.
5. Greater output voltage swing can be obtained by connecting a resistor from booster terminal to V−.

AC TEST CIRCUIT



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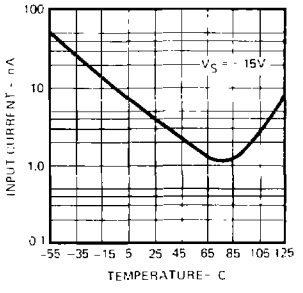
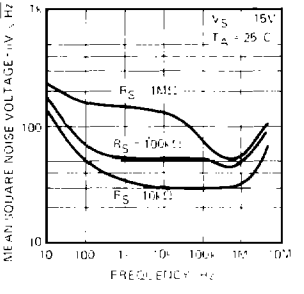
TYPICAL PERFORMANCE CURVES

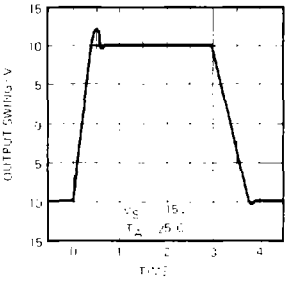
Input Current



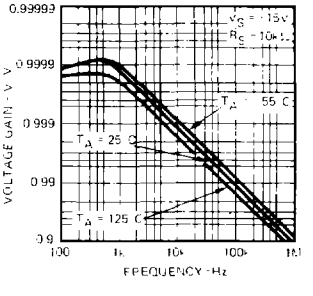
Output Noise Voltage



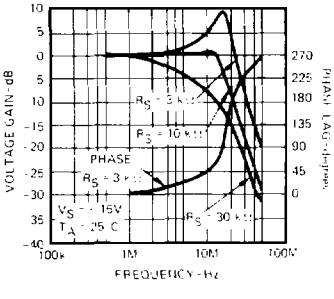
Large Signal Pulse Response



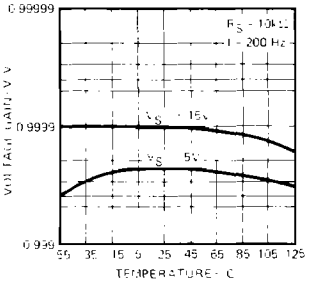
Voltage Gain



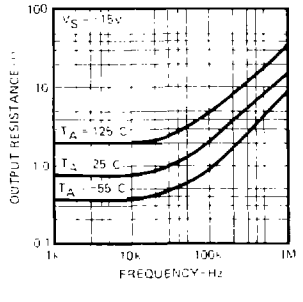
Voltage Gain



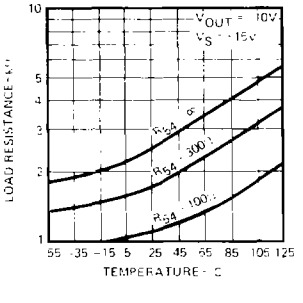
Voltage Gain



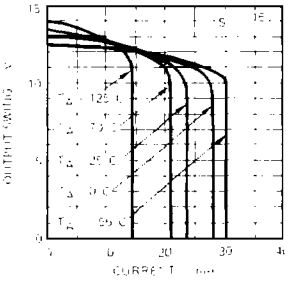
Output Resistance



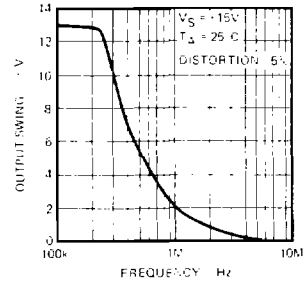
Symmetrical Output Swing



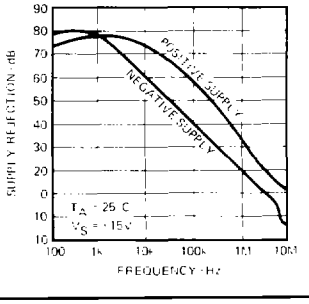
Positive Output Swing



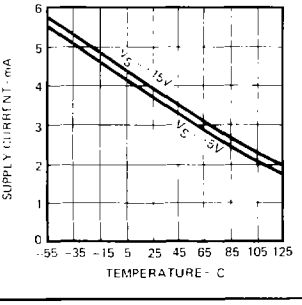
Large Signal Frequency Response



Power Supply Rejection



Supply Current



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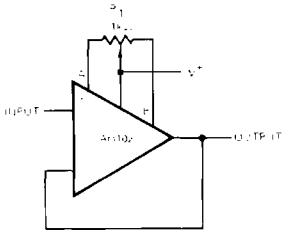
APPLICATIONS

Offset Nulling Circuit



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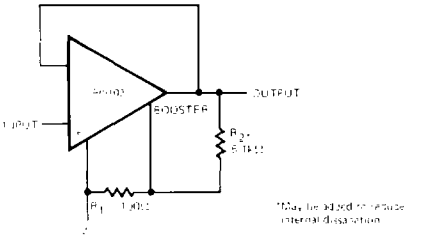
Increasing Negative Swing Under Load



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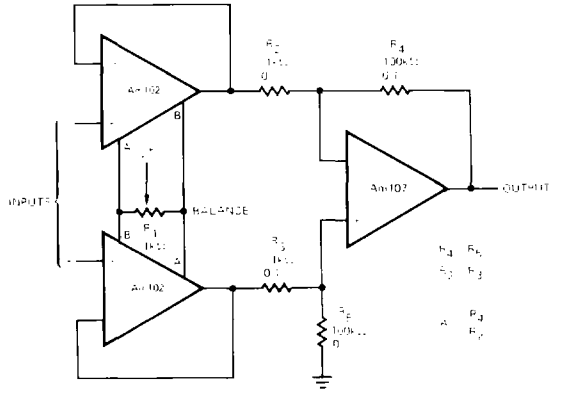
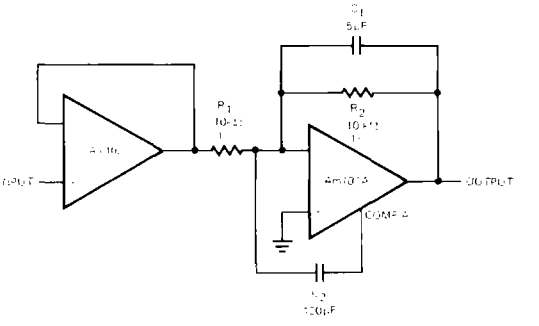
Differential Input Instrumentation Amplifier



LIC-662

Fast Inverting Amplifier With High Input Impedance



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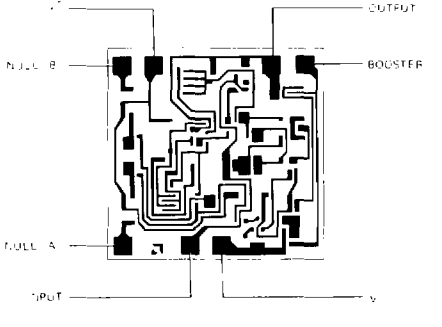
Metallization and Pad Layout



40 x 40 Mils