Am110/210/310

Voltage F llower

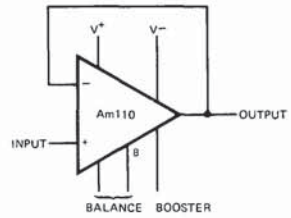
Distinctive Characteristics

- The Am110/210/310 are functionally, electrically, and pin for pin equivalent to the National LM 110/210/310
- Slew rate 30V/μs
- Small signal bandwidth 20 MHz
- Input current 10 nA max over temperature
- Supply voltage range ±5V 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

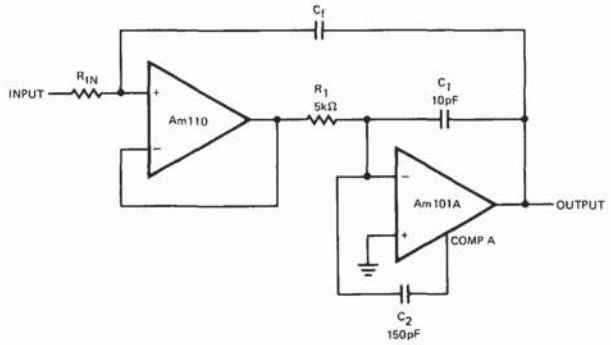
The Am110/210/310 are voltage followers featuring high-speed, low-input currents and large input voltage range They are internally compensated with provision for external offset adjustment Operation over wide supply voltages and temperature is possible

FUNCTIONAL DIAGRAM



TYPICAL APPLICATION

Fast Integrator With Low Input Current



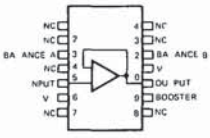
ORDERING INFORMATION

Part Number	Package Type	Temperature Range	Order Number
Am310	TO 99	0°C to +70°C	LM310H
	DIP	0°C to +70°C	LM310D
	Flat Package	0°C to +70°C	LM310F
	Molded DIP	0°C to +70°C	LM310N
	Dice	0°C to +70°C	LD310
Am210	TO 99	−25°C to +85°C	LM210H
	DIP	−25°C to +85°C	LM210D
	Flat Pak	−25°C to +85°C	LM210F
Am110	TO 99	−55°C to +125°C	LM110H
	DIP	−55°C to +125°C	LM110D
	Flat Package	−55°C to +125°C	LM110F
	Dice	−55°C to +125°C	LD110

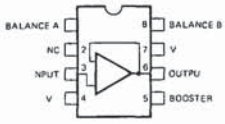
CONNECTION DIAGRAMS

Top Views

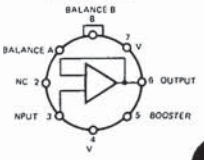
Dual-In-Line



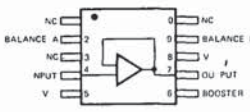
Dual-In-Line



Metal Can



Flat Package



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		±18 V
Internal Power Dissipation (Note 1)		500 mW
Input Voltage (Note 2)		±15 V
Output Short-Circuit Duration (Note 3)		Indefinite
Operating Temperature Range	Am110	−55°C to +125°C
	Am210	−25°C to +85°C
	Am310	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	Am310 Min	Am310 Typ	Am310 Max	Am110 Am210 Min	Am110 Am210 Typ	Am110 Am210 Max	Units
Input Offset Voltage			2 5	7 5		1 5	4 0	mV
Input Bias Current			2 0	7 0		1 0	3 0	nA
Input Resistance		10^4	10^6		10^4	10^6		MΩ
Input Capacitance			1 5			1 5		pF
Large-Signal Voltage Gain	R_L = 8 kΩ, V_{out} = ±10 V, V_S = ±15 V	0 999	0 9999		0 999	0 9999		V/V
Output Resistance			0 75	2 5		0 75	2 5	Ω
Supply Current			3 9	5 5		3 9	5 5	mA
Slew Rate	V_S = ±15 V, V_{IN} = ±10 V, R_L = 10 kΩ		30		20	30		V/μs
The Following Specifications Apply Over The Operating Temperature Ranges								
Input Offset Voltage				10 0			6 0	mV
Input Bias Current				10 0			10 0	nA
Large-Signal Voltage Gain	R_L = 10 kΩ, V_{out} = ±10 V, V_S = ±15 V	0 999			0 999			V/V
Output Voltage Swing (Note 5)	R_L = 10 kΩ, V_S = ±15 V	±10			±10			V
Supply Current	T_A = +125°C					2 0	4 0	mA
Supply Voltage Rejection Ratio	±5 V ≤ V_S ≤ ±18 V	_70			70			dB
Average Temperature Coefficient of Input Offset Voltage	0° ≤ T_A ≤ 70°C		10					μV/°C
	−55°C ≤ T_A ≤ 85°C +85°C ≤ T_A ≤ 125°C					6 12		μV/°C

Notes 1 Derate Metal Can package 6 8 mW/°C for operation at ambient temperatures above 75°C the Dual In Line at 9 mW/°C for operation at ambient temperatures above 95°C and the Flat Packages at 5 4 mW/°C for operation at ambient temperatures above 57°C

2 For supply voltages less than ±15 V the maximum input voltage is equal to the supply voltage

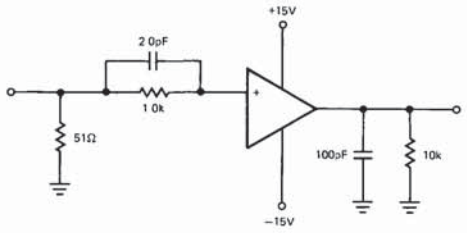
3 To prevent damage when the output is shorted it is necessary to insert a resistor larger than 2 kΩ in series with the input Continuous short circuit is allowed for case temperatures to 125°C and ambient temperatures to 70°C for the 110/210 For 310 the corresponding temperatures are 70°C and 55°C respectively

4 Unless otherwise specified these specifications apply for supply voltages from ±5 to +18 V

5 Greater output voltage swing can be obtained by connecting a resistor from booster terminal to V−

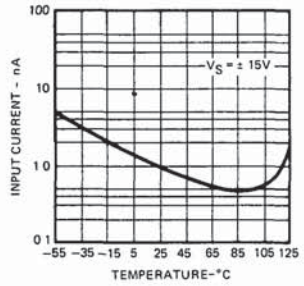
7

AC TEST CIRCUIT

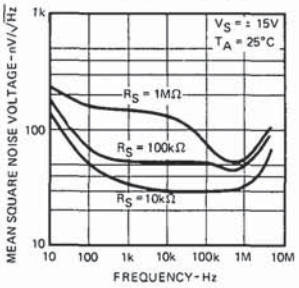


PERFORMANCE CURVES

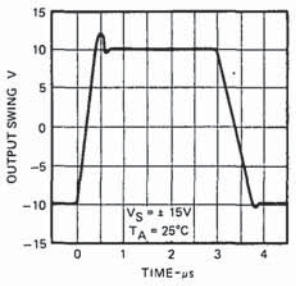
Input Current



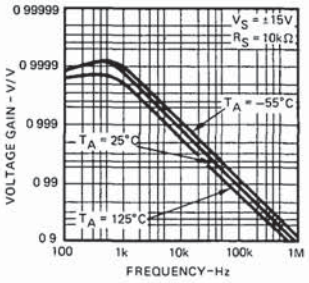
Output Noise Voltage



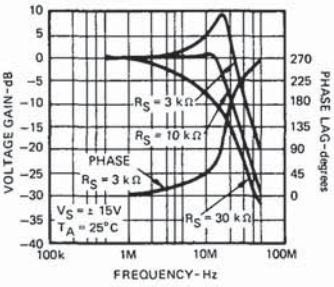
Large Signal Pulse Response



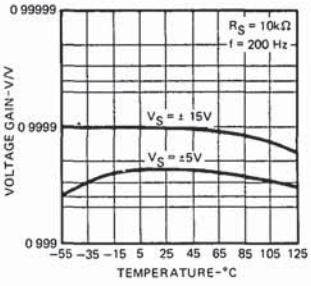
Voltage Gain



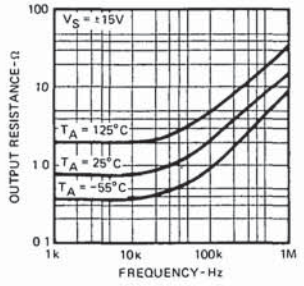
Voltage Gain



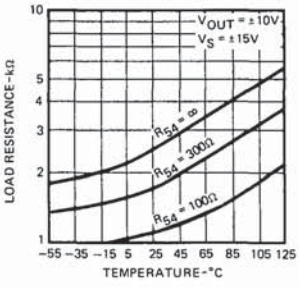
Voltage Gain



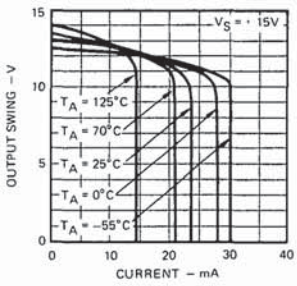
Output Resistance



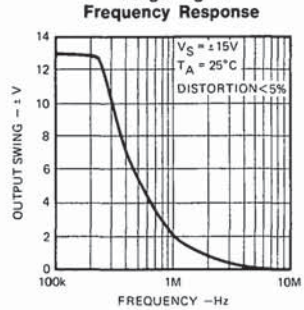
Symmetrical Output Swing



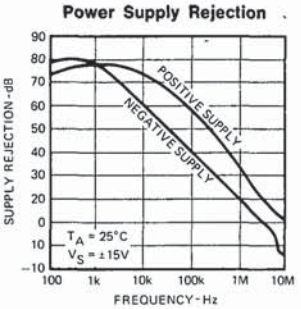
Positive Output Swing



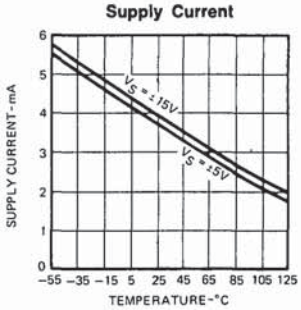
Large Signal Frequency Response



Power Supply Rejection

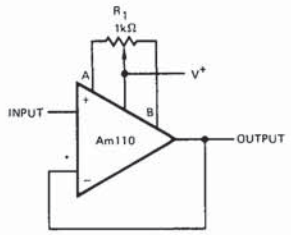


Supply Current

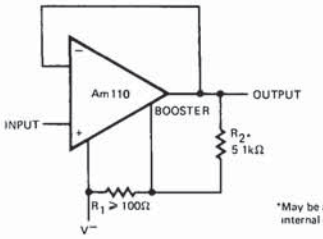


APPLICATIONS

Offset Nulling Circuit

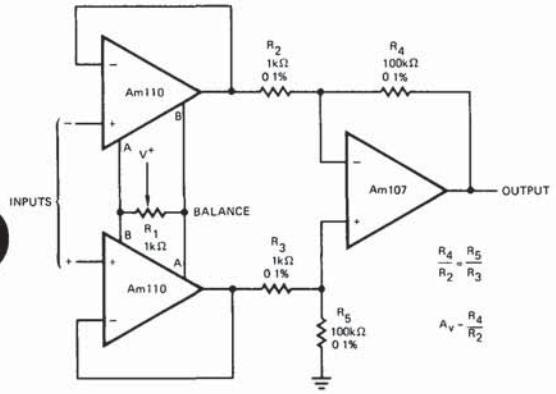


Increasing Negative Swing Under Load

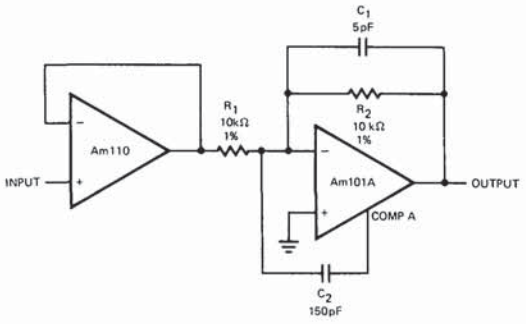


*May be added to reduce internal dissapation

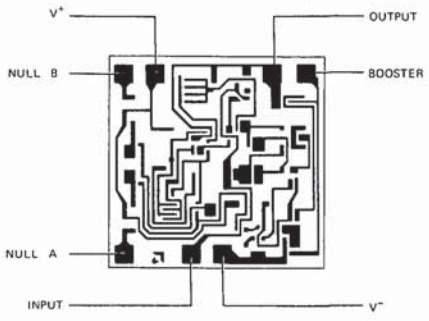
Differential Input Instrumentation Amplifier



Fast Inverting Amplifier With High Input Impedance



Metallization and Pad Layout



40 x 40 Mils