μA107 • μA207 • μA307

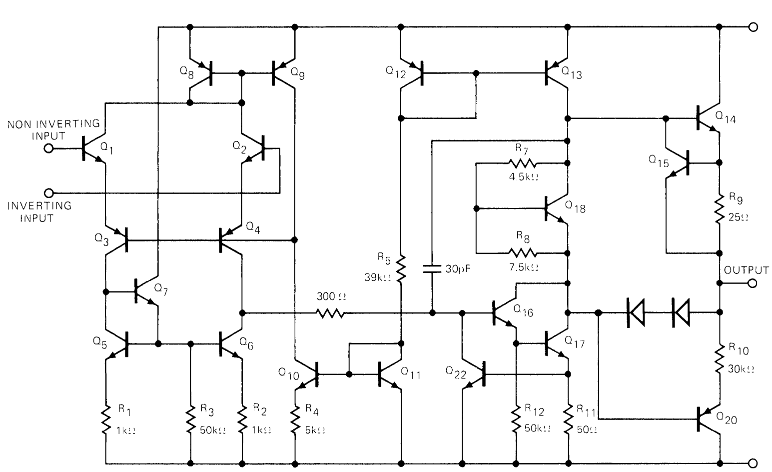
GENERAL-PURPOSE OPERATIONAL AMPLIFIERS

FAIRCHILD LINEAR INTEGRATED CIRCUITS

GENERAL DESCRIPTION – The μA107 General Purpose Operational Amplifier series is constructed using the Fairchild Planar* epitaxial process. Advanced processing techniques have reduced the 107 input current an order of magnitude below industry standards such as the μA709 while still replacing, pin-for-pin, μA709, μA101, μA101A, and μA741. The μA107, μA207, and μA307 offer better accuracy, internal compensation, and lower noise for high impedance circuit applications while providing features similar to the μA101A. The low input currents allow the device to be used in slow-charge applications such as long period integrators, slow ramps, and sample-and-hold circuits. The μA207 is identical to the μA107 except that the μA207 performance is guaranteed from −25°C to +85°C while the μA107 performance is guaranteed over a −55°C to +125°C temperature range. The μA307 is available in both TO-99 and 8-pin mini DIP packages and is guaranteed over a 0°C to +70C temperature range.

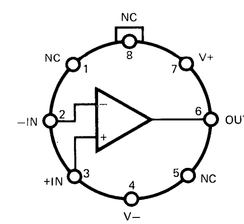
- LOW OFFSET VOLTAGE
- LOW INPUT CURRENT
- LOW OFFSET CURRENT
- GUARANTEED DRIFT CHARACTERISTICS
- GUARANTEED OFFSETS OVER COMMON MODE RANGE

EQUIVALENT CIRCUIT



Pin connections shown are for metal can.

CONNECTION DIAGRAMS
8-PIN METAL CAN
(TOP VIEW)
PACKAGE OUTLINE 5S
PACKAGE CODE H

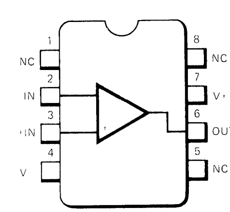


Note: Pin 4 connected to case.

ORDER INFORMATION

TYPE	PART NO.
μA107	μA107HM
μA207	μA207HM
μA307	μA307HC

8-PIN MINI DIP
(TOP VIEW)
PACKAGE OUTLINE 9T
PACKAGE CODE T



ORDER INFORMATION

TYPE	PART NO.
μA307	μA307TC

Dual In-line Package and Flatpak Available By Special Request

*Planar is patented Fairchild process.

ABSOLUTE MAXIMUM RATINGS

Supply Voltage	
Military and Instrument (μA107 and μA207)	±22 V
Commercial (μA307)	±18 V
Internal Power Dissipation (Note 1)	
Metal Can	500 mW
Mini DIP	310 mW
Differential Input Voltage	±30 V
Input Voltage (Note 2)	±15 V
Storage Temperature Range	
Metal Can	−65°C to +150°C
Mini DIP	−55°C to +125°C
Operating Temperature Range	
Military (μA107)	−55°C to +125°C
Instrument (μA207)	−25°C to +85°C
Commercial (μA307)	0°C to +70°C
Pin Temperature (Soldering)	
Metal Can (60 s)	300°C
Mini DIP (10 s)	260°C
Output Short Circuit Duration (μA107 and μA207)	Indefinite
(μA307, Note 3)	Indefinite

NOTES:
1. Rating applies to ambient temperatures up to 70°C. Above 70°C ambient derate linearly at 6.3 mW/°C for metal can and 5.6 mW/°C for the mini DIP.
2. For supply voltages less than ±15 V, the absolute maximum input voltage is equal to the supply voltage.
3. Continuous short circuit is allowed for case temperatures to 70°C and ambient temperatures to 55°C.

μA107 and μA207

ELECTRICAL CHARACTERISTICS: ±5.0 V ≤ V_S ≤ ±20 V, T_A = 25°C for μA107 and μA207 unless otherwise specified.

CHARACTERISTICS	CONDITIONS	MIN	TYP	MAX	UNITS
Input Offset Voltage	$R_S \leq 50$ kΩ		0.7	2.0	mV
Input Offset Current			1.5	10	nA
Input Bias Current			30	75	nA
Input Resistance		1.5	4.0		MΩ
Supply Current	V_S = ±20 V		1.8	3.0	mA
Large Signal Voltage Gain	V_S = ±15 V V_{OUT} = ±10 V, $R_L \geq 2$ kΩ	50	160		V/mV
The following applies for 55°C ≤ T_A ≤ 125°C unless otherwise specified					
Input Offset Voltage	$R_S \leq 50$ kΩ			3.0	mV
Average Temperature Coefficient of Input Offset Voltage			3.0	15	μV/°C
Input Offset Current				20	nA
Average Temperature Coefficient of Input Offset Current	25°C ≤ T_A ≤ 125°C		0.01	0.1	nA/°C
	−55°C ≤ T_A ≤ 25°C		0.02	0.2	nA/°C
Input Bias Current				100	nA
Supply Current	T_A = +125°C, V_S = ±20 V		1.2	2.5	mA
Large Signal Voltage Gain	V_S = ±15 V, V_{OUT} = ±10 V $R_L \geq 2$ kΩ	25			V/mV
Output Voltage Swing	V_S = ±15 V, R_L = 10 kΩ	±12	±14		V
	V_S = ±15 V, R_L = 2 kΩ	±10	±13		V
Input Voltage Range	V_S = ±20 V	±15			V
Common Mode Rejection Ratio	$R_S \leq 50$ kΩ	80	96		dB
Supply Voltage Rejection Ratio	$R_S \leq 50$ kΩ	80	96		dB

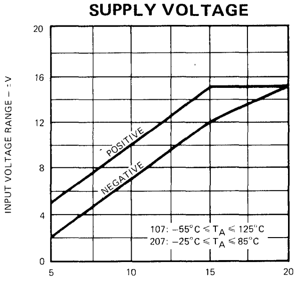
μA307

ELECTRICAL CHARACTERISTICS: ±5.0 V ≤ V_S ≤ ±15 V, T_A = 25°C unless otherwise specified.

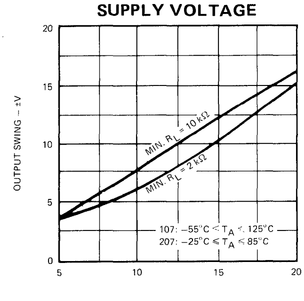
CHARACTERISTICS	CONDITIONS	MIN	TYP	MAX	UNITS
Input Offset Voltage	R_S ≤ 50 kΩ		2.0	7.5	mV
Input Offset Current			3.0	50	nA
Input Bias Current			70	250	nA
Input Resistance		0.5	2.0		MΩ
Supply Current	V_S = ±15 V		1.8	3.0	mA
Large Signal Voltage Gain	V_S = ±15 V V_{OUT} = ±10 V, R_L ≥ 2 kΩ	25	160		V/mV
The following specifications apply for 0°C ≤ TA ≤ 70°C					
Input Offset Voltage	R_S ≤ 50 kΩ			10	mV
Average Temperature Coefficient of Input Offset Voltage			6.0	30	μV/°C
Input Offset Current				70	nA
Average Temperature Coefficient of Input Offset Current	25°C ≤ T_A ≤ 70°C		0.01	0.3	nA/°C
	0°C ≤ T_A ≤ 25°C		0.02	0.6	nA/°C
Input Bias Current				300	nA
Large Signal Voltage Gain	V_S = ±15 V, V_{OUT} = ±10 V R_L ≥ 2 kΩ	15			V/mV
Output Voltage Swing	V_S = ±15 V, R_L = 10 kΩ	±12	±14		V
	V_S = ±15 V, R_L = 2 kΩ	± 10	±13		V
Input Voltage Range	V_S = ±15 V	±12			V
Common Mode Rejection Ratio	R_S ≤ 50 kΩ	70	90		dB
Supply Voltage Rejection Ratio	R_S ≤ 50 kΩ	70	96		dB

GUARANTEED PERFORMANCE CURVES FOR μA107 AND μA207

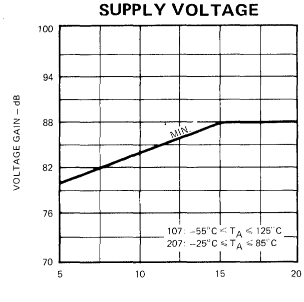
INPUT VOLTAGE RANGE AS A FUNCTION OF SUPPLY VOLTAGE



OUTPUT SWING AS A FUNCTION OF SUPPLY VOLTAGE

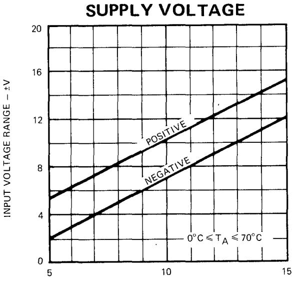


VOLTAGE GAIN AS A FUNCTION OF SUPPLY VOLTAGE

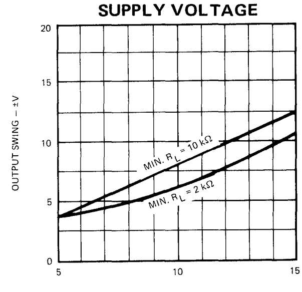


GUARANTEED PERFORMANCE CURVES FOR μA307

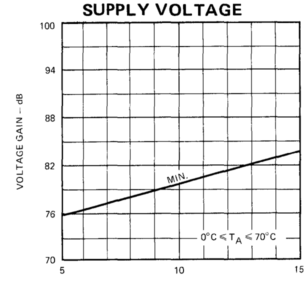
INPUT VOLTAGE RANGE AS A FUNCTION OF SUPPLY VOLTAGE



OUTPUT SWING AS A FUNCTION OF SUPPLY VOLTAGE



VOLTAGE GAIN AS A FUNCTION OF SUPPLY VOLTAGE



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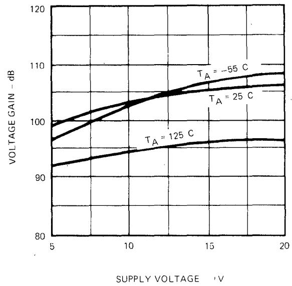
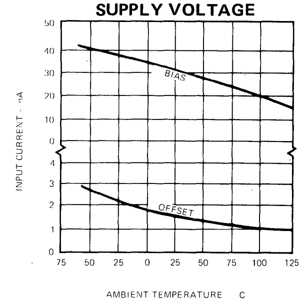
TYPICAL PERFORMANCE CURVES FOR μA107 AND μA207

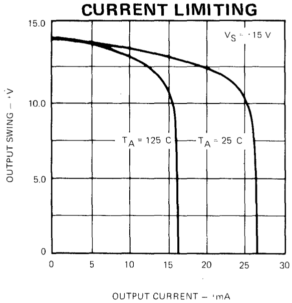
VOLTAGE GAIN AS A FUNCTION OF SUPPLY VOLTAGE



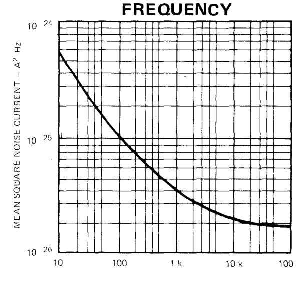
INPUT CURRENT AS A FUNCTION OF SUPPLY VOLTAGE



CURRENT LIMITING

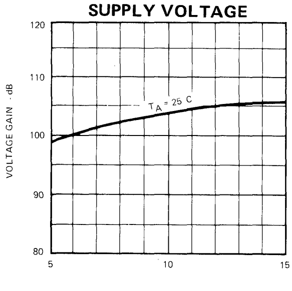


INPUT NOISE CURRENT AS A FUNCTION OF FREQUENCY

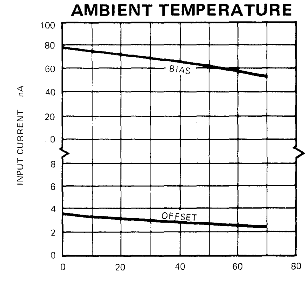


TYPICAL PERFORMANCE CURVES FOR μA307

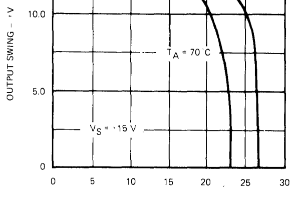
VOLTAGE GAIN AS A FUNCTION OF SUPPLY VOLTAGE



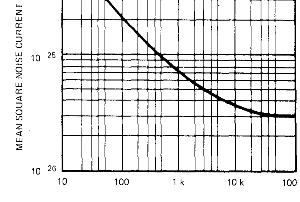
INPUT CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE



CURRENT LIMITING

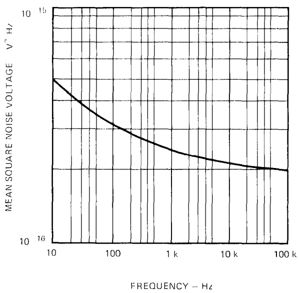


INPUT NOISE CURRENT AS A FUNCTION OF FREQUENCY

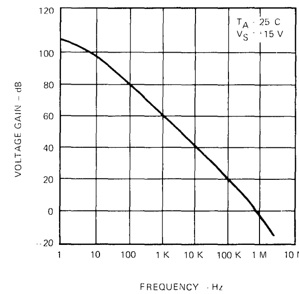


TYPICAL PERFORMANCE CURVES

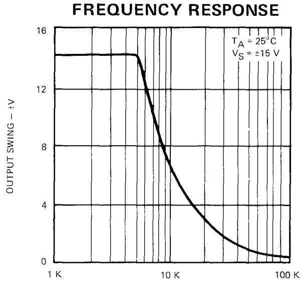
INPUT NOISE VOLTAGE AS A FUNCTION OF FREQUENCY



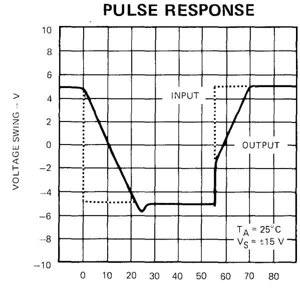
OPEN LOOP FREQUENCY RESPONSE



LARGE SIGNAL FREQUENCY RESPONSE



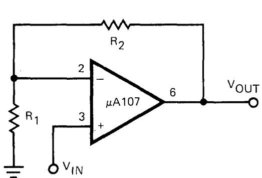
VOLTAGE FOLLOWER PULSE RESPONSE



TYPICAL APPLICATIONS

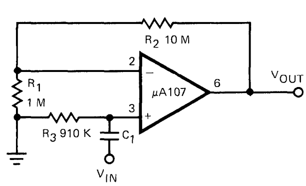
(All pin numbers shown refer to 8-pin TO-5 package)

NON-INVERTING AMPLIFIER



$$V_{OUT} = \frac{R_1 + R_2}{R_1} V_{IN}$$

NON-INVERTING AC AMPLIFIER

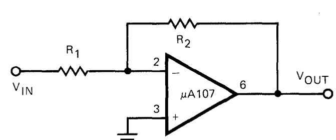


$$V_{OUT} = \frac{R_1 + R_2}{R_1} V_{IN}$$

$$R_{IN} = R_3$$

$$R_3 = R_1 R_2$$

INVERTING AMPLIFIER



$$V_{OUT} = \frac{R_2}{R_1} V_{IN}$$

$$R_{IN} = R_1$$