FAIRCHILD

A Schlumberger Company

μA107 • μA207 • μA307 General Purpose Operational Amplifiers

Linear Products

Description

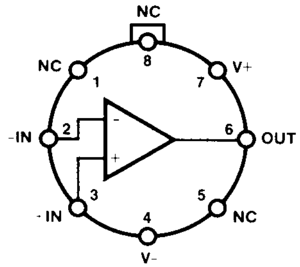
The μA107 General Purpose Operational Amplifier series is constructed using the Fairchild Planar epitaxial process. Advanced processing techniques have reduced the 107 input current an order of magnitude below industry standards such as the μA709 while still replacing, pin-for-pin, μA709, μA101, μA101A, 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 guaranteed over a 0°C to +70°C temperature range.

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

Absolute Maximum Ratings

Supply Voltage	
Military and Instrument (μA107 and μA207)	±22 V
Commercial (μA307)	±18 V
Internal Power Dissipation (Note 1)	
Metal Package	500 mW
Molded DIP	310 mW
Differential Input Voltage	±30 V
Input Voltage (Note 2)	±15 V
Storage Temperature Range	
Metal Package	−65°C to +150°C
Molded 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 Package (60 s)	300°C
Molded DIP (10 s)	260°C
Output Short Circuit Duration (Note 3)	Indefinite

Connection Diagram
8-Pin Metal Package



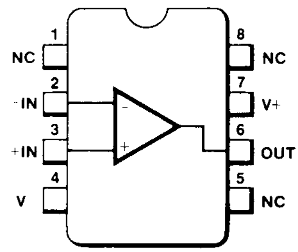
(Top View)

Pin 4 connected to case.

Order Information

Type	Package	Code	Part No.
μA107	Metal	5W	μA107HM
μA207	Metal	5W	μA207HM
μA307	Metal	5W	μA307HC

8-Pin Molded DIP



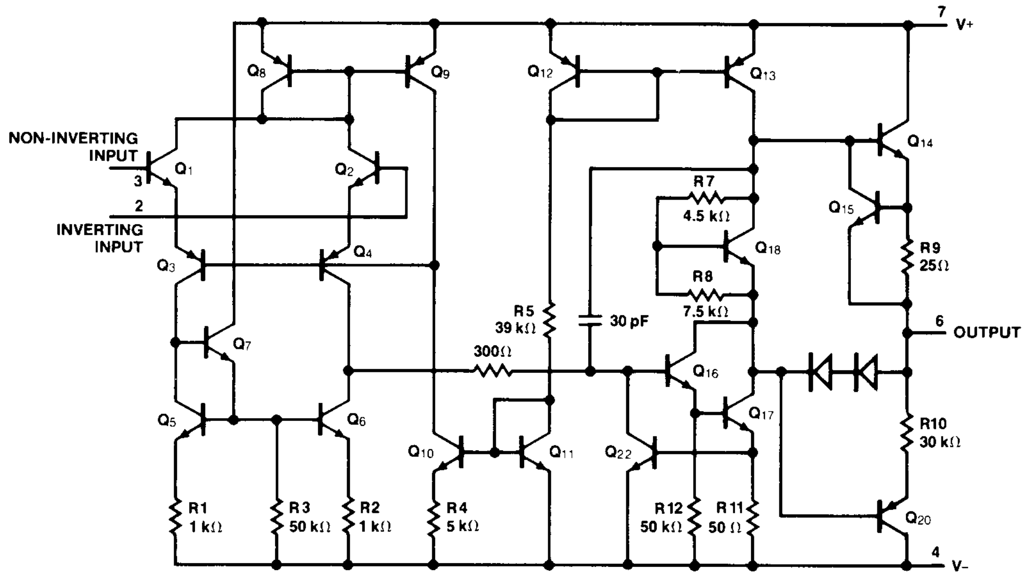
(Top View)

Order Information

Type	Package	Code	Part No.
μA307	Molded DIP	9T	μA307TC

Notes on following page.

Equivalent Circuit



Notes

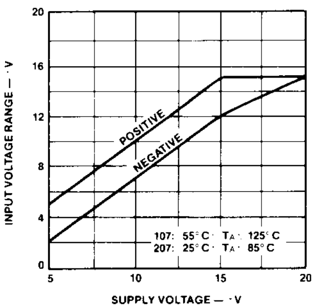
1. Rating applies to ambient temperatures up to 70°C. Above 70°C ambient derate linearly at 6.3 mW/°C for metal package and 5.6 mW/°C for the molded DIP.
2. For supply voltages less than ± 15 V, the absolute maximum input voltage is equal to the supply voltage.
3. Continuous short circuit is allowed with μA307 for case temperatures to 70°C and ambient temperatures to 55°C.

μA107/μA207
Electrical Characteristics $\pm 5.0\ V \le V_S \le \pm 20\ V$, $T_A = 25°C$ unless otherwise specified.

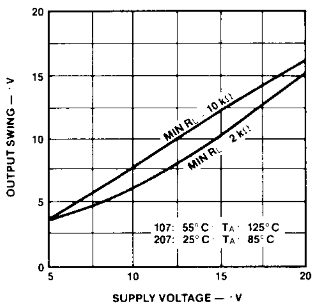
Characteristics	Conditions	Min	Typ	Max	Units
Input Offset Voltage	$R_S \le 50\ k\Omega$		0.7	2.0	mV
Input Offset Current			1.5	10	nA
Input Bias Current			30	75	nA
Input Resistance		1.5	4.0		MΩ
Supply Current	$V_S = \pm 20\ V$		1.8	3.0	mA
Large Signal Voltage Gain	$V_S = \pm 15\ V$ $V_{OUT} = \pm 10\ V$, $R_L \ge 2\ k\Omega$	50	160		V/mV
The following applies for $55°C \le T_A \le 125°C$ unless otherwise specified					
Input Offset Voltage	$R_S \le 50\ k\Omega$			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	$25°C \le T_A \le 125°C$		0.01	0.1	nA/°C
	$-55°C \le T_A \le 25°C$		0.02	0.2	nA/°C
Input Bias Current				100	nA
Supply Current	$T_A = +125°C$, $V_S = \pm 20\ V$		1.2	2.5	mA
Large Signal Voltage Gain	$V_S = \pm 15\ V$, $V_{OUT} = \pm 10\ V$ $R_L \ge 2\ k\Omega$	25			V/mV
Output Voltage Swing	$V_S = \pm 15\ V$, $R_L = 10\ k\Omega$	±12	±14		V
	$V_S = \pm 15\ V$, $R_L = 2\ k\Omega$	±10	±13		V
Input Voltage Range	$V_S = \pm 20\ V$	±15			V
Common Mode Rejection Ratio	$R_S \le 50\ k\Omega$	80	96		dB
Supply Voltage Rejection Ratio	$R_S \le 50\ k\Omega$	80	96		dB

Guaranteed Performance Curves for μA107 and μA207

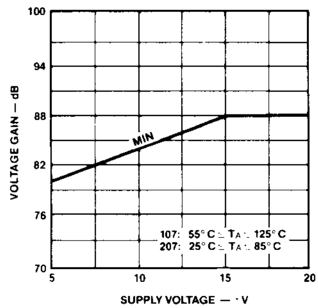
Input Voltage Range vs Supply Voltage



Output Swing vs Supply Voltage



Voltage Gain vs Supply Voltage



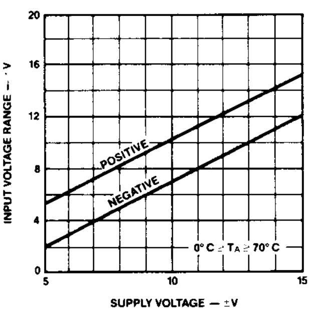
μA307

Electrical Characteristics $\pm 5.0\ V \leq V_S \leq \pm 15\ V$, $T_A = 25°C$ unless otherwise specified.

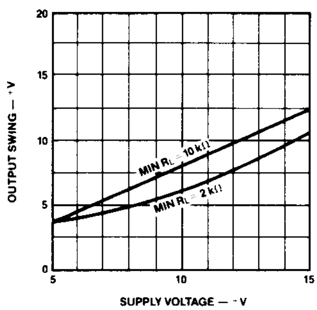
Characteristics	Conditions	Min	Typ	Max	Units
Input Offset Voltage	$R_S \leq 50\ k\Omega$		2.0	7.5	mV
Input Offset Current			3.0	50	nA
Input Bias Current			70	250	nA
Input Resistance		0.5	2.0		MΩ
Supply Current	$V_S = \pm 15\ V$		1.8	3.0	mA
Large Signal Voltage Gain	$V_S = \pm 15\ V$ $V_{OUT} = \pm 10\ V$, $R_L \geq 2\ k\Omega$	25	160		V/mV
The following specifications apply for $0°C \leq T_A \leq 70°C$					
Input Offset Voltage	$R_S \leq 50\ k\Omega$			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	$25°C \leq T_A \leq 70°C$		0.01	0.3	nA/°C
	$0°C \leq T_A \leq 25°C$		0.02	0.6	nA/°C
Input Bias Current				300	nA
Large Signal Voltage Gain	$V_S = \pm 15\ V$, $V_{OUT} = \pm 10\ V$ $R_L \geq 2\ k\Omega$	15			V/mV
Output Voltage Swing	$V_S = \pm 15\ V$, $R_L = 10\ k\Omega$	±12	±14		V
	$V_S = \pm 15\ V$, $R_L = 2\ k\Omega$	±10	±13		V
Input Voltage Range	$V_S = \pm 15\ V$	±12			V
Common Mode Rejection Ratio	$R_S \leq 50\ k\Omega$	70	90		dB
Supply Voltage Rejection Ratio	$R_S \leq 50\ k\Omega$	70	96		dB

Guaranteed Performance Curves for μA307

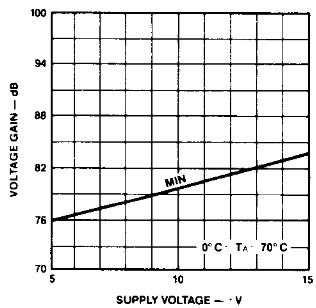
Input Voltage Range vs Supply Voltage



Output Swing vs Supply Voltage

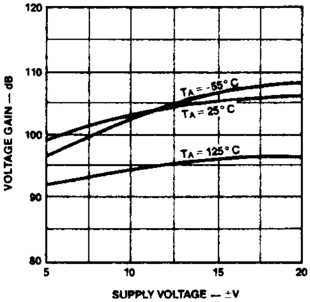


Voltage Gain vs Supply Voltage

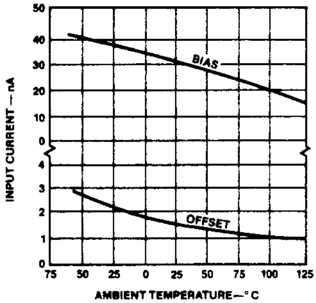


Typical Performance Curves for μA107 and μA207

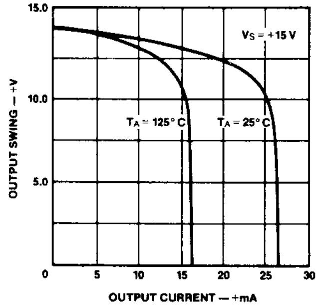
Voltage Gain vs Supply Voltage



Input Current vs Supply Voltage



Current Limiting



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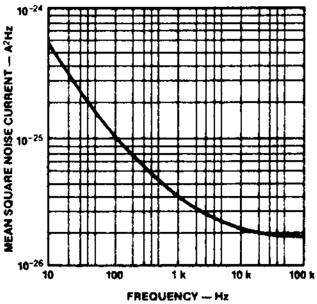
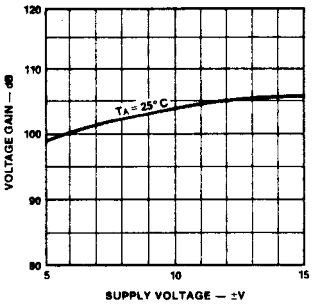
Typical Performance Curves for μA307

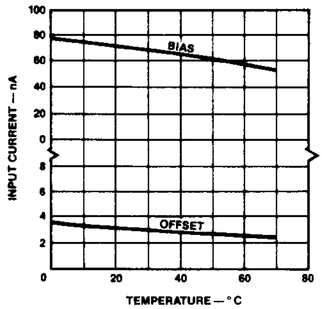
Input Noise Current vs Frequency



Voltage Gain vs Supply Voltage

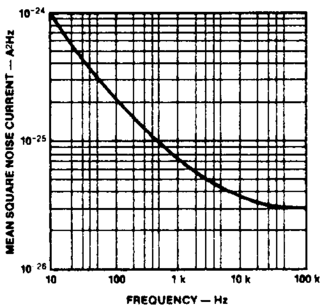


Input Current vs Ambient Temperature

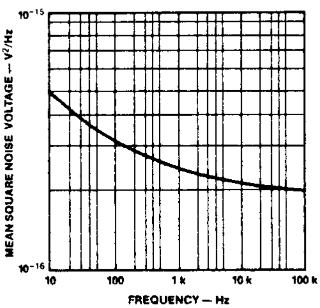


Typical Performance Curves for μA307 (Cont.)

Current Limiting

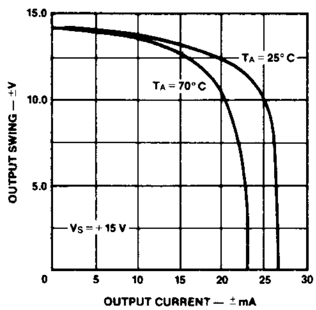


Input Noise Current vs Frequency



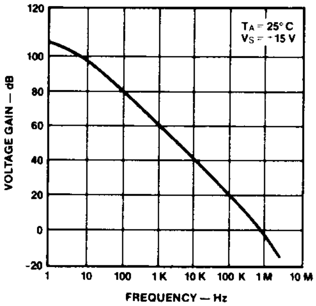
Typical Performance Curves for μA107, μA207, μA307 (Cont.)

Input Noise Voltage vs Frequency

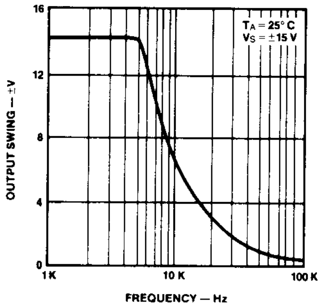


Typical Performance Curves for μA107, μA207 and μA307 (Cont.)

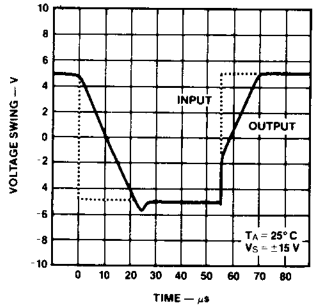
Open Loop Frequency Response



Large Signal Frequency Response

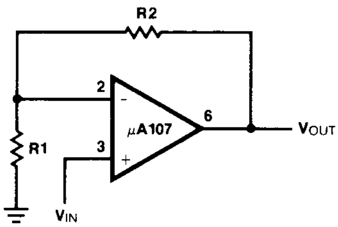


Voltage Follower Pulse Response



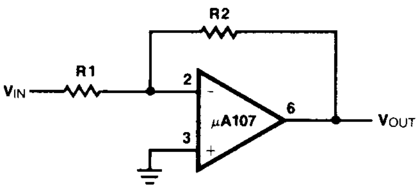
Typical Applications

Non-Inverting Amplifier



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

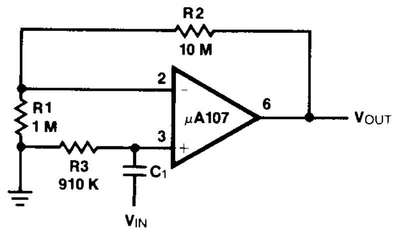
Inverting Amplifier



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

$R_{IN} = R_1$

Non-Inverting AC Amplifier



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

$R_{IN} = R_3$

$R_3 = R_1 R_2$