INTERSIL

LM107, LM307
Operational Amplifiers

FEATURES

- Offset voltage 3 mV maximum over temperature (107)
- Input current 100 nA maximum over temperature (107)
- Offset current 20 nA maximum over temperature (107)
- Guaranteed drift characteristics
- Offsets guaranteed over entire common mode range

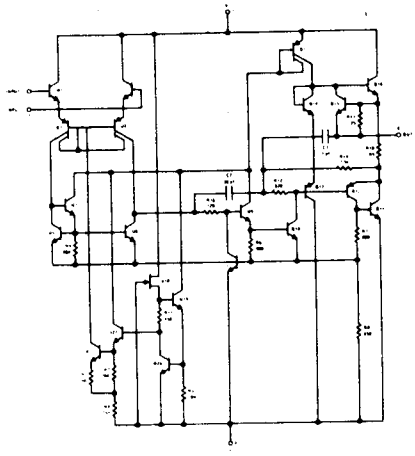
GENERAL DESCRIPTION

The 107 series amplifiers are complete, general purpose operational amplifiers, with the necessary frequency compensation built into the chip. Advanced processing techniques make the input currents a factor of ten lower than industry standards like the 709. Yet, they are a direct, plug-in replacement for the 709, LM101, LM101A and 741.

The 107 series provides better accuracy and lower noise than its predecessors in high impedance circuitry. The low input currents also make it particularly well suited for long interval integrators of timers, sample and hold circuits and low frequency waveform generators. Further, replacing circuits where matched transistor pairs buffer the inputs of conventional IC op amps, it can give lower offset voltage and drift at reduced cost.

The 307 has somewhat different specifications, and operates from 0°C to 70°C.

EQUIVALENT SCHEMATIC



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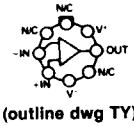
ORDERING INFORMATION

Part number	TO-99 Can	10 pin Flatpak	14 pin CERDIP	8 pin DIP	Dice
LM107	LM107H*	LM107F*	LM107J-14*		LM107/D
LM307	LM307H	LM307F	LM307J-14	LM307N	LM307/D

* Add /883B to ordering number if 883B processing desired.

PIN CONFIGURATIONS



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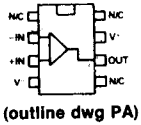

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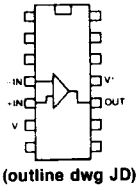

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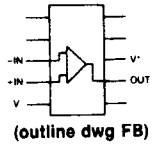

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ABSOLUTE MAXIMUM RATINGS

Supply Voltage 107,	±22V	Operating Temperature Range 107	−55°C to 125°C
307	±18V	307	0°C to 70°C
Power Dissipation (Note 1)	500 mW	Storage Temperature Range	−65°C to 150°C
Differential Input Voltage	±30V	Lead Temperature (Soldering, 60 sec)	300°C
Input Voltage (Note 2)	±15V		
Output Short-Circuit Duration (Note 3)	Indefinite		

Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions above those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

SWITCHING CHARACTERISTICS

PARAMETER	CONDITIONS	107 MIN	107 TYP	107 MAX	307 MIN	307 TYP	307 MAX	UNITS
Input Offset Voltage	$T_A = 25°C$, $R_S \leq 50\,k\Omega$		0.7	2.0		2.0	7.5	mV
Input Offset Current	$T_A = 25°C$		1.5	10		3	50	nA
Input Bias Current	$T_A = 25°C$		30	75		70	250	nA
Input Resistance	$T_A = 25°C$	1.5	4		0.5	2		MΩ
Supply Current	$T_A = 25°C$, $V_S = \pm 20V$		1.8	3.0				mA
	$T_A = 25°C$, $V_S = \pm 15V$					1.8	3.0	mA
Large Signal Voltage Gain	$T_A = 25°C$, $V_S = \pm 15V$, $V_{OUT} = \pm 10V$, $R_L \geq 2\,k\Omega$	50	160		25	160		V/mV
Input Offset Voltage	$R_S \leq 50\,k\Omega$			3.0			10	mV
Average Temperature Coefficient of Input Offset Voltage			3.0	15		6.0	30	µV/°C
Input Offset Current				20			70	nA
Average Temperature Coefficient of Input Offset Current	$25°C \leq T_A \leq 125°C$		0.01	0.1				nA/°C
	$-55°C \leq T_A \leq 25°C$		0.02	0.2				nA/°C
	$25°C \leq T_A \leq 70°C$					0.01	0.3	nA/°C
	$0°C \leq T_A \leq 25°C$					0.02	0.6	nA/°C
Input Bias Current				100			300	mA
Supply Current	$T_A = +125°C$, $V_S = \pm 20V$		1.2	2.5				mA
Large Signal Voltage Gain	$V_S = \pm 15V$, $V_{OUT} = \pm 10V$, $R_L \geq 2\,k\Omega$	25			15			V/mV
Output Voltage Swing	$V_S = \pm 15V$, $R_L = 10\,k\Omega$	±12	±14		±12	±14		V
	$R_L = 2\,k\Omega$	±10	±13		±10	±13		V
Input Voltage Range	$V_S = \pm 20V$	±15						V
	$V_S = \pm 15V$				±12			V
Common Mode Rejection Ratio	$R_S \leq 50\,k\Omega$	80	96		70	90		dB
Supply Voltage Rejection Ratio	$R_S \leq 50\,k\Omega$	80	96		70	96		dB

Note 1: The maximum junction temperature of the 107 is 150°C. For operating at elevated temperatures, devices in the TO-5 package must be derated based on a thermal resistance of 150°C/W, junction to ambient, or 45°C/W, junction to case.

Note 2: For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.

Note 3: Continuous short circuit is allowed for case temperatures to 70°C and ambient temperatures to 55°C.

Note 4: These specifications apply for $\pm 5V < V_s < \pm 20V$ and $-55°C \leq T_A \leq 125°C$ for the 107, unless otherwise specified. For the 307, the specifications apply for $0°C \leq T_A \leq 70°C$ and $\pm 5V \leq V_s \leq \pm 15V$, unless otherwise specified.