

Operational Amplifier

For Military, Industrial, and Commercial Applications

Applications:

- Long-interval integrators
- Timers
- Sample-and-hold circuits
- Summing amplifiers
- Multivibrators

The RCA CA307 is a general-purpose operational amplifier intended for use in military, industrial, and commercial applications. A 30-pF on-chip capacitor provides internal frequency compensation.

The CA307 is available in 8-lead TO-5 style packages with

standard leads (T suffix), with dual-in-line formed leads ("DIL-CAN", S suffix), in the 8-lead dual-in-line plastic package ("MINI-DIP", E suffix), and in chip form (H suffix).

The CA307 is a direct replacement for industry type 307 in packages with similar terminal arrangements.

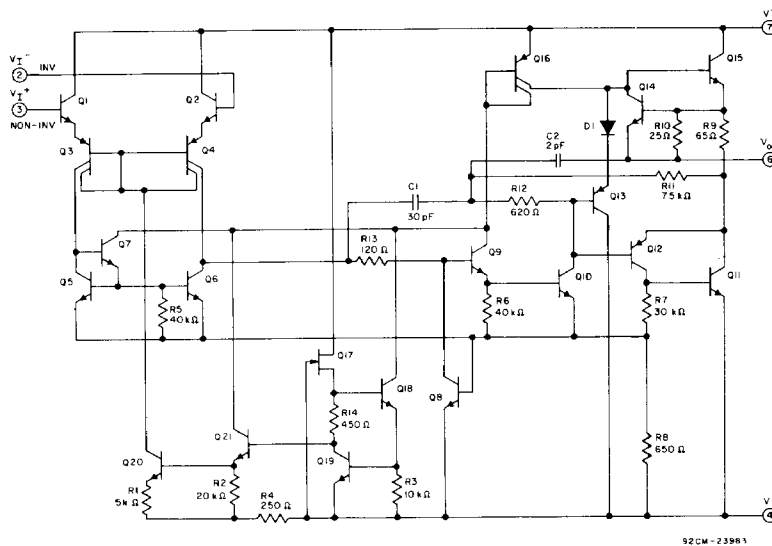


Fig. 1 - Schematic diagram of CA307.

*Technical Data on LM Branded types is identical to the corresponding CA Branded types.

CA307, LM307

Maximum Ratings, Absolute Maximum Values at $T_A = 25^\circ\text{C}$:

DC SUPPLY VOLTAGE (Between V^+ and V^- Terminals):	
CA307	36 V
DC INPUT VOLTAGE	
(For supply voltages less than $\pm 15\text{ V}$, the absolute maximum input voltage is equal to the supply voltage)	$\pm 15\text{ V}$
DIFFERENTIAL INPUT VOLTAGE	
OUTPUT SHORT-CIRCUIT DURATION*	Indefinite
DEVICE DISSIPATION UP TO $T_A = 70^\circ\text{C}$	
Above $T_A = 70^\circ\text{C}$ Derate linearly at	500 mW
AMBIENT TEMPERATURE RANGE:	
Operating	0°C to $+70^\circ\text{C}$ †
Storage	-65°C to $+150^\circ\text{C}$
LEAD TEMPERATURE (During Soldering):	
At distance $1/16 \pm 1/32$ inch ($1.59 \pm 0.79\text{ mm}$) from case for 10 seconds max.	$+265^\circ\text{C}$

*For type CA307 continuous short circuit is allowed for Case Temperature to $+70^\circ\text{C}$ and ambient temperature to $+55^\circ\text{C}$.

†Types CA307 E, S, and T can be operated over the temperature range of -55 to $+125^\circ\text{C}$, although the published limits for certain electrical specifications apply only over the temperature range of 0 to 70°C .

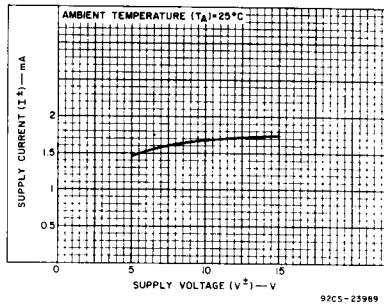


Fig. 2 - Supply current vs. supply voltage.

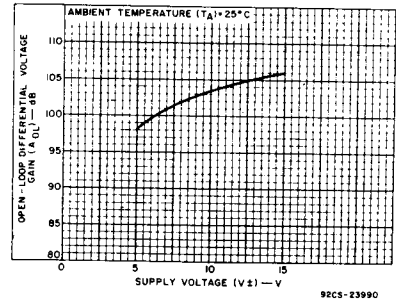


Fig. 3 - Open-loop differential voltage gain vs. supply voltage.

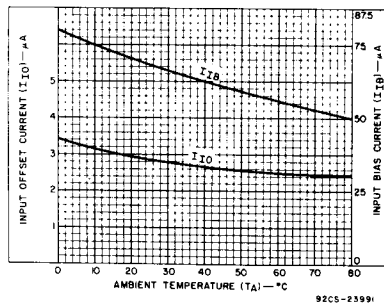


Fig. 4 - Input offset and input bias current vs. ambient temperature.

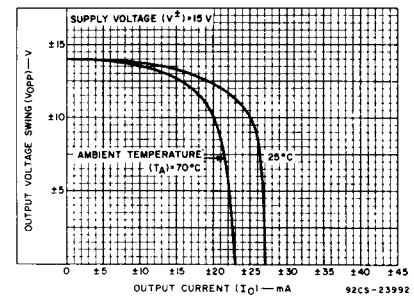


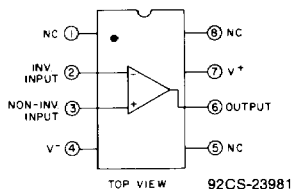
Fig. 5 - Output voltage swing vs. output current.

CA307, LM307

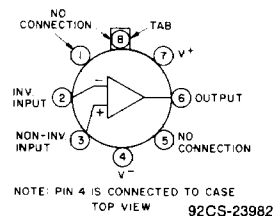
ELECTRICAL CHARACTERISTICS

CHARACTERISTIC		TEST CONDITIONS Δ	LIMITS			UNITS
		Supply Voltage (V_{\pm}) = 5 V to 15 V	CA307			
			Min.	Typ.	Max.	
Input Offset Voltage	V_{io}	$T_A = 25^{\circ}\text{C}$, $R_s \leq 50\text{ k}\Omega$	—	2	7.5	mV
		$R_s \leq 50\text{ k}\Omega$	—	—	10	
Average Temperature Coefficient of Input Offset Voltage	αV_{io}		—	6	30	$\mu\text{V}/^{\circ}\text{C}$
Input Offset Current	I_{io}		—	—	70	nA
		$T_A = 25^{\circ}\text{C}$	—	3	50	
Average Temperature Coefficient of Input Offset Current	αI_{io}	+25 to 70 $^{\circ}\text{C}$	—	0.01	0.3	nA/ $^{\circ}\text{C}$
		0 to +25 $^{\circ}\text{C}$	—	0.02	0.6	
Input Bias Current	I_{ib}		—	—	300	nA
		$T_A = 25^{\circ}\text{C}$	—	70	250	
Supply Current	I_{\pm}	$T_A = +125^{\circ}\text{C}$, $V_{\pm} = 20\text{ V}$	—	—	—	mA
		$T_A = 25^{\circ}\text{C}$, $V_{\pm} = 15\text{ V}$	—	1.8	3	
Open-Loop Differential Voltage Gain	A_{oL}	$V_{\pm} = 15\text{ V}$, $V_o = \pm 10\text{V}$, $R_L \geq 2\text{ k}\Omega$	15	—	—	V/mV
		$V_{\pm} = 15\text{V}$, $V_o = \pm 10\text{ V}$, $R_L \geq 2\text{ k}\Omega$, $T_A = 25^{\circ}\text{C}$	25	160	—	
Input Resistance	R_i	$T_A = 25^{\circ}\text{C}$	0.5	2	—	M Ω
Output Voltage Swing	V_{OPP}	$V_{\pm} = 15\text{ V}$, $R_L = 10\text{ k}\Omega$	± 12	± 14	—	V
		$V_{\pm} = 15\text{ V}$, $R_L = 2\text{ k}\Omega$	± 10	± 13	—	
Input Voltage Range	V_{ICR}	$V_{\pm} = 15\text{ V}$	± 12	—	—	V
Common-Mode Rejection Ratio	CMRR	$R_s \leq 50\text{ k}\Omega$	70	90	—	dB
Supply-Voltage Rejection Ratio	PSRR	$R_s \leq 50\text{ k}\Omega$	70	96	—	dB

Δ Characteristics applicable over operating temperature range $T_A = 0$ to 70 $^{\circ}\text{C}$ unless otherwise specified.



FUNCTIONAL DIAGRAM FOR PLASTIC PACKAGE



FUNCTIONAL DIAGRAM FOR TO-5 STYLE PACKAGES

CA307, LM307

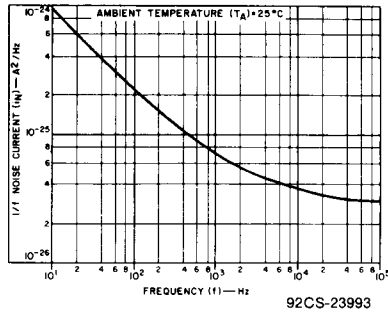


Fig. 6 - 1/f noise current vs. frequency.

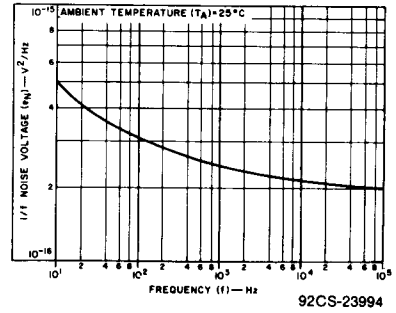


Fig. 7 - 1/f noise voltage vs. frequency.

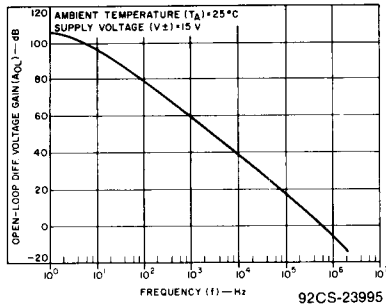


Fig. 8 - Open-loop differential voltage gain vs. frequency.

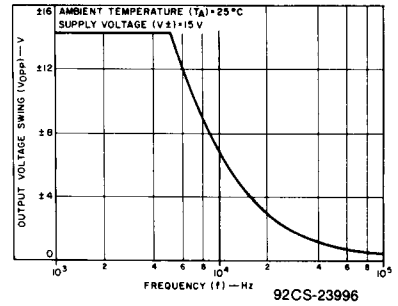


Fig. 9 - Output voltage swing vs. frequency.

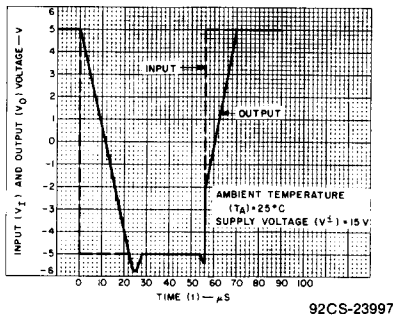
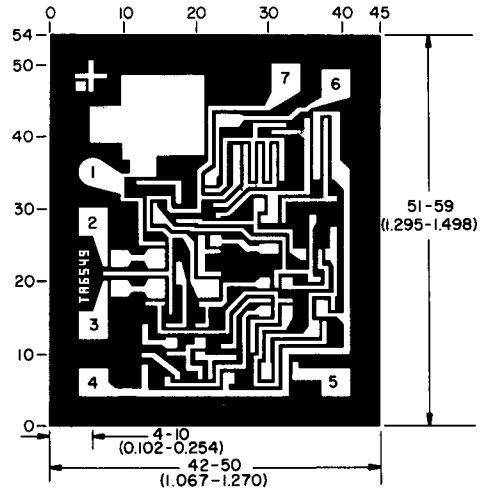


Fig. 10 - Input and output voltage vs. time.



Dimensions and pad layout for CA307H.

Dimensions in parentheses are in millimeters and are derived from the basic inch dimensions as indicated. Grid graduations are in mils (10^{-3} inch).