signetics

OPERATIONAL AMPLIFIER μA709

LINEAR INTEGRATED CIRCUITS

DESCRIPTION

The μA709 is a high performance monolithic operational amplifier with differential inputs. High open loop gain, high input impedance, wide input common mode and output voltage ranges plus low temperature drift enable it to be used in many applications formerly satisfied only by discrete amplifiers.

FEATURES

- **OPEN LOOP VOLTAGE GAIN =** **45,000**
- **OUTPUT VOLTAGE SWING =** **±14V**
- **INPUT COMMON MODE RANGE =** **±10V**
- **DIFFERENTIAL INPUT RESISTANCE = μA709 250kΩ**
  μA709C 400kΩ

ABSOLUTE MAXIMUM RATINGS

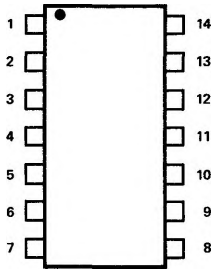
Supply Voltage	±18V
Internal Power Dissipation (Note 1)	N5709 250 mW
	S5709 300 mW
Differential Input Voltage	±5.0V
Input Voltage	±10V
Open Short-Circuit Duration (T_A = 25°C)	-25°C
Storage Temperature Range	-65°C to +150°C
Operating Temperature Range	μA709C 0°C to +75°C
	μA709 -55°C to +125°C
Lead Temperature (Soldering, 60 sec)	300°C

NOTE:

1. Rating applied for case temperatures to +125°C; derate linearly at 5.6mW/°C for ambient temperatures above +95°C.

PIN CONFIGURATIONS

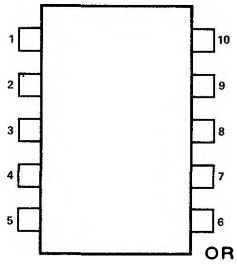
A PACKAGE
(Top View)



ORDER PART NOS.
μA790A/μA709CA

1. NC
2. NC
3. Input compensation A
4. Inverting input
5. Non-inverting input
6. V^-
7. NC
8. NC
9. Output Compensation
10. Output
11. V^+
12. Input compensation B
13. NC
14. NC

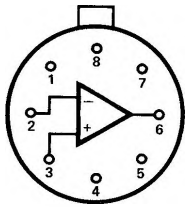
G PACKAGE



1. NC
2. Input compensation A
3. Inverting input
4. Non-inverting input
5. V^-
6. Output compensation
7. Output
8. V^+
9. Input compensation B
10. NC

ORDER PART NOS. μA709G/μA709CG

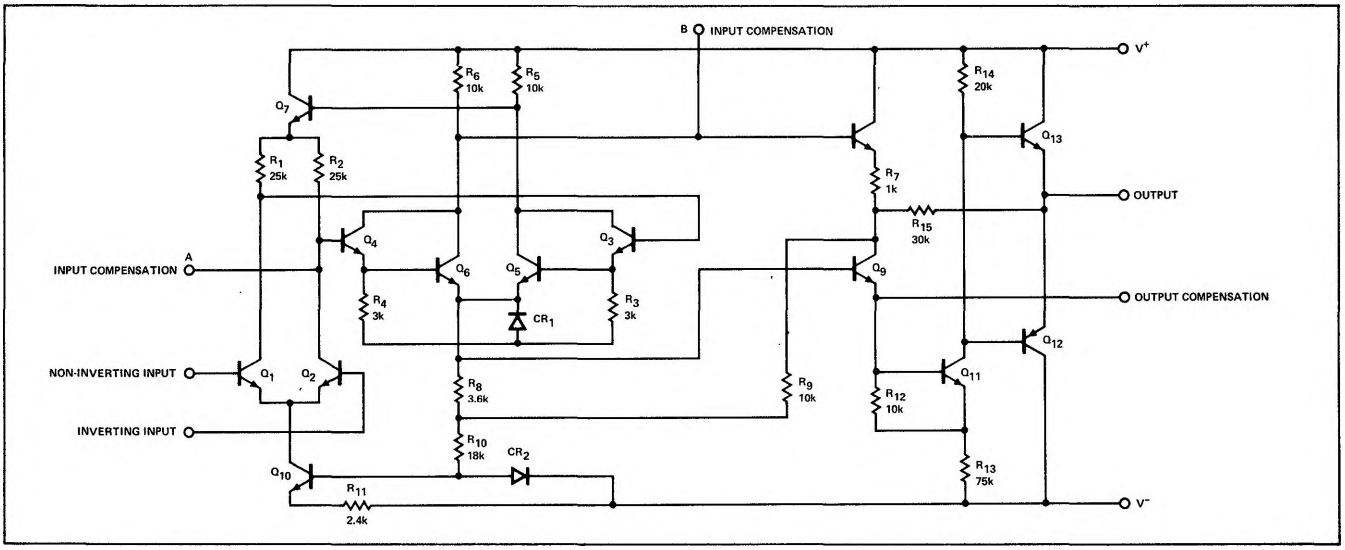
T PACKAGE



1. Input compensation A
2. Inverting input
3. Non-inverting input
4. V^-
5. Output compensation
6. Output
7. V^+
8. Input compensation B

ORDER PART NOS. μA709T/μA709CT

BASIC CIRCUIT SCHEMATIC



ELECTRICAL CHARACTERISTICS ($T_A = \pm 25^oC$, $V_S = \pm 15V$ (709C); $\pm 9 \leq V_S \leq \pm 15$ (709) unless otherwise specified)

PARAMETER	TEST CONDITIONS	μA709			μA709C			UNITS
		MIN.	TYP.	MAX.	MIN.	TYP.	MAX.	
INPUT CHARACTERISTICS								
Offset Voltage @ 25°C	$R_S \leq 10K\Omega$, $+9V \leq V_S \leq +15V$		1	5		2	7.5	mV
Over Temperature	$R_S \leq 10K\Omega$, $\pm 9V \leq \pm 15V$			6			10	mV
Offset Current @ 25°C			50	200		100	500	nA
Over Temperature	$T_A = +125^oC$		20	200				nA
	$T_A = -55^oC$		100	500				nA
	$0^oC \leq T_A \leq 75^oC$						750	nA
Bias Current @ 25°C			200	500		300	1500	nA
Over Temperature	$T_A = -55^oC$		0.5	1.5				μA
INPUT RESISTANCE @ 25°C		150	400		50	250		kΩ
Over Temperature		40	100		35			kΩ
INPUT VOLTAGE RANGE @ 25°C					±8.0	±10		V
Over Temperature	$V_S = \pm 15V$	±8.0	±10					V
OUTPUT CHARACTERISTICS								
Resistance @ 25°C			150			150		Ω
Voltage Swing	$R_L \geq 10K\Omega$				±12	±14		V
	$R_L \geq 2k\Omega$				±10	±13		V
Over Temperature	$V_S = \pm 15V$, $R_L \geq 10K\Omega$	±12	±14					V
	$V_S = \pm 15V$, $R_L \geq 2K\Omega$	±10	±13					V
POWER CONSUMPTION	$V_S = +15V$		80	165		80	200	mW
TRANSIENT RESPONSE (Figure 1)	$V_{in} = 10mV$, $R_L = 2K\Omega$							
Rise Time			0.3	1.0		0.3	1.0	μW
Overshoot	$C_L \leq 100$ pF		10	30		10	30	%
LARGE SIGNAL VOLTAGE GAIN @ 25°C	$R_L \geq 25K\Omega$; $V_{out} = \pm 10V$				15,000	45,000		V/V
Over Temperature	$R_L \geq 25K\Omega$, $V_{out} = \pm 10V$	25,000	45,000	70,000	12,000			V/V
COMMON MODE REJECTION RATIO @ 25°C	$R_S \leq 10K\Omega$				65	90		dB
Over Temperature	$R_S \leq 10K\Omega$	70	90					dB
SUPPLY VOLTAGE REJECTION RATIO @ 25°C	$R_S \leq 10K\Omega$					25	200	mV/V
Over Temperature	$R_S \leq 10K\Omega$	25	150					μV/V
AVERAGE TEMPERATURE Coefficient of Input	$R_S = 50\Omega$		3.0					μV/°C
Offset Voltage	$R_S \leq 10K\Omega$		6.0					μV/°C

TEST CIRCUIT