FAIRCHILD

A Schlumberger Company

MIL-STD-883
July 1986—Rev 2[5]

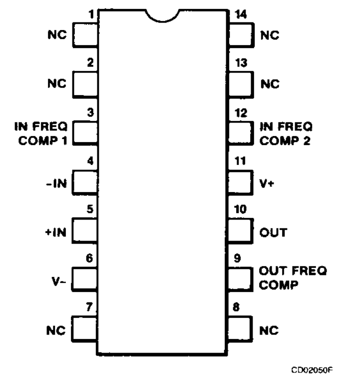
μA709QB High Performance Operational Amplifier

Aerospace and Defense Data Sheet
Linear Products

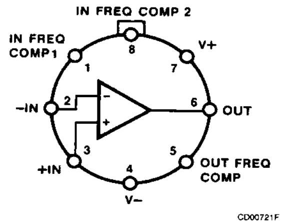
Description

The μA709QB is a monolithic high gain operational amplifier constructed using the Fairchild Planar Epitaxial process. It features low offset, high input impedance, large input common mode range, high output swing under load, and low power consumption. The device displays exceptional temperature stability and will operate over a wide range of supply voltages with little performance degradation. The amplifier is intended for use in DC servo systems, high impedance analog computers, low level instrumentation applications and for the generation of special linear and non-linear transfer functions.[6]

Connection Diagram 14-Lead DIP (Top View)

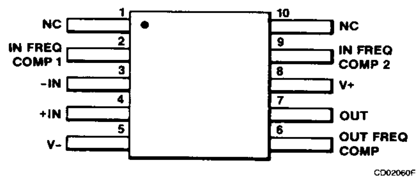


Connection Diagram 8-Lead Can (Top View)



Lead 4 connected to case.

Connection Diagram 10-Lead Flatpak (Top View)



Order Information

Part No.	Case/ Finish	Package Code Mil-M-38510, Appendix C
μA709DMQB	CA	D-1 14 Lead DIP
μA709HMQB	GC	A-1 8-Lead Can
μA709FMQB	HA	F-4 10-Lead Flatpak

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Absolute Maximum Ratings

Storage Temperature Range	−65°C to +175°C
Operating Temperature Range	−55°C to +125°C
Lead Temperature (soldering, 60 s)	300°C
Internal Power Dissipation[10]	
Can and Flatpak	330 mW
DIP	400 mW
Supply Voltage	±18 V
Differential Input Voltage	±5.0 V
Input Voltage	±10 V
Short Circuit Duration	5.0 s

Processing: MIL-STD-883, Method 5004

Burn-In: Method 1015, Condition A, PDA calculated using Method 5005, Subgroup 1

Quality Conformance Inspection: MIL-STD-883, Method 5005

Group A Electrical Tests Subgroups:

1. Static tests at 25°C
2. Static tests at 125°C
3. Static tests at −55°C
4. Dynamic tests at 25°C
5. Dynamic tests at 125°C
6. Dynamic tests at −55°C
9. AC tests at 25°C

Group C and D Endpoints: Group A, Subgroup 1

Notes

1. 100% Test and Group A
2. Group A
3. Periodic tests, Group C
4. Guaranteed but not tested
5. When changes occur, FSC will make data sheet revisions available. Contact local sales representative for the latest revision.
6. For more information on device function, refer to the Fairchild Linear Data Book Commercial Section.
7. Z_I is guaranteed by I_{IB}: $Z_I = 2.0\ V_T/I_{IB}$, $V_T = 26$ mV at 25°C, 34 mV at 125°C, and 19 mV at −55°C.
8. P_c is guaranteed by I_{CC}: $P_c = 30\ I_{CC}$.
9. V_{IR} is guaranteed by the CMR test.
10. Rating applies to ambient temperatures up to 125°C. Above 125°C ambient, derate linearly at 150°C/W for the Can and Flatpak, and 120°C/W for the DIP.

μA709QB
Electrical Characteristics $\pm 9.0\ V \leq V_{CC} \leq \pm 15\ V$

Symbol	Characteristic		Condition		Min	Max	Unit	Note	Subgrp
V_{IO}	Input Offset Voltage		$50\ \Omega \leq R_S \leq 10\ k\Omega$, $V_{CM} = 0\ V$			5.0	mV	1	1
						6.0	mV	1	2,3
I_{IO}	Input Offset Current		$V_{CM} = 0\ V$			200	nA	1	1,2
						500	nA	1	3
I_{IB}	Input Bias Current		$V_{CC} = \pm 15\ V$, $V_{CM} = 0\ V$			340	nA	1	1
						950	nA	1	3
Z_I	Input Impedance[7]				150		kΩ	1	1
					40		kΩ	1	3
I_{CC}	Supply Current		$V_{CC} = \pm 15\ V$			5.5	mA	1	1
P_c	Power Consumption[8]		$V_{CC} = \pm 15\ V$			165	mW	1	1
CMR	Common Mode Rejection		$V_{CM} = \pm 8.0\ V$, $R_S = 10\ k\Omega$		70		dB	1	1,2,3
V_{IR}	Input Voltage Range[9]		$V_{CC} = \pm 15\ V$		±8.0		V	1	1,2,3
PSRR	Power Supply Rejection Ratio		$\pm 9.0\ V \leq V_{CC} \leq \pm 18\ V$, $R_S = 10\ k\Omega$			150	μV/V	1	1,2,3
A_{VS}	Large Signal Voltage Gain		$V_{CC} = \pm 15\ V$, $R_L = 2.0\ k\Omega$, $V_O = 10\ k\Omega$		25	70	V/mV	1	4,5,6
V_{OP}	Output Voltage Swing		$V_{CC} = \pm 15\ V$	$R_L = 10\ k\Omega$	±12		V	1	4,5,6
				$R_L = 2.0\ k\Omega$	±10		V	1	4,5,6
$TR(t_r)$	Transient Response	Rise Time	$V_{CC} = \pm 15\ V$, $V_I = 20\ mV$, $R_L = 2.0\ k\Omega$, $C1 = 5.0\ nF$			1.0	μs	2	9
$TR(o_s)$		Overshoot	$V_{CC} = \pm 15\ V$, $R_2 = 50\ \Omega$, $C_L = 100\ pF$, $R1 = 1.5\ k\Omega$, $C2 = 200\ pF$			30	%	2	9

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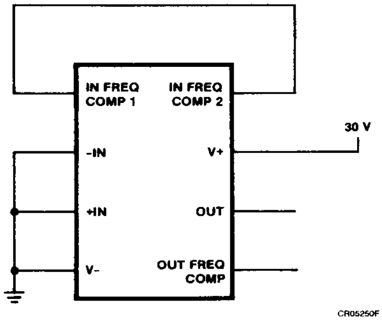
Primary Burn-In Circuit



Equivalent Circuit