FAIRCHILD

A Schlumberger Company

MIL-STD-883
July 1986—Rev 15

µA101AQB General Purpose Operational Amplifier

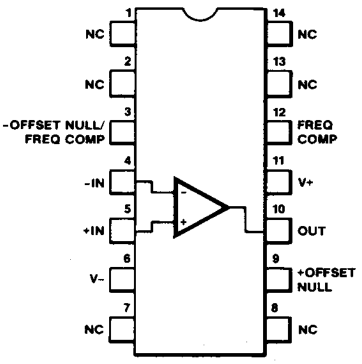
Aerospace and Defense Data Sheet
Linear Products

Description

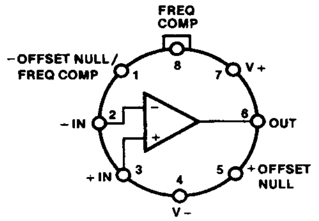
The µA101AQB is a general purpose monolithic operational amplifier constructed using the Fairchild Planar Epitaxial process. This integrated circuit is intended for applications requiring low input offset voltage or low input offset current. The accuracy of long interval integrators, timers, and sample and hold circuits is improved due to the low drift and low bias currents. Frequency response may be matched to the individual circuit need with one external capacitor. The absence of 'latch-up' coupled with internal short circuit protection make the µA101AQB virtually foolproof.[6]

- Low Offset Current And Voltage
- Low Offset Current Drift
- Low Bias Current
- Short Circuit Protected
- Low Power Consumption

Connection Diagram 14-Lead DIP (Top View)

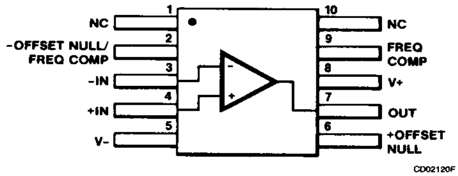


Connection Diagram 8-Lead Can (Top View)



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
µA101ADMQB	CA	D-1 14-Lead DIP
µA101AHMQB	GC	A-1 8-Lead Can
µA101AFMQB	HA	F-4 10-Lead Flatpak

JAN Product Available

10103	BCA	D-1 14-Lead DIP
10103	BCB	D-1 14-Lead DIP
10103	BGA	A-1 8-Lead Can
10103	BGC	A-1 8-Lead Can
10103	BHA	F-4 10-Lead Flatpak
10103	BHB	F-4 10-Lead Flatpak
10103	BPA	D-4 8-Lead DIP
10103	BPB	D-4 8-Lead DIP

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[11]	
Can and Flatpak	330 mW
DIP	400 mW
Supply Voltage	±22 V
Differential Input Voltage	±30 V
Input Voltage[12]	±20 V
Short Circuit Duration[13]	Indefinite

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
10. AC tests at 125°C
11. AC tests at −55°C

Group C and D Endpoints: Group A, Subgroup 1

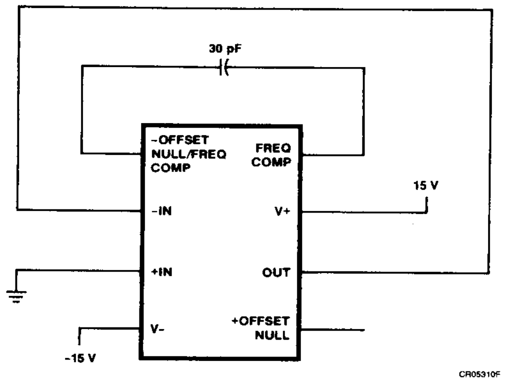
Notes

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}: $Z_I = 4.0\ V_T/I_{IB}$, $V_T = 26$ mV at 25°C, 34 mV at 125°C and 19 mV at −55°C.
8. P_c is guaranteed by I_{CC}: $P_c = 40\ I_{CC}$.
9. V_{IR} is guaranteed by the CMR test.
10. BW is guaranteed by t_r: $BW = 0.35/t_r$.
11. 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.
12. For supply voltages less than ±20 V, the absolute maximum input voltage is equal to the supply voltage.
13. Short circuit may be to ground or either supply. Rating applies to 125°C case temperature or 75°C ambient temperature.

μA101AQB
Electrical Characteristics $V_{CC} = \pm 20$ V, unless otherwise specified.

Symbol	Characteristic		Condition		Min	Max	Unit	Note	Subgrp
V_{IO}	Input Offset Voltage		$\pm 5.0\ V \leqslant V_{CC} \leqslant \pm 20$ V, $R_S = 50\ \Omega, V_{CM} = 0$ V			2.0	mV	1	1
						3.0	mV	1	2,3
$\Delta V_{IO}/\Delta T$	Input Offset Voltage Temperature Sensitivity		$25°C \leqslant T_A \leqslant 125°C$			25	μV/°C	4	2
			$-55°C \leqslant T_A \leqslant +25°C$			25	μV/°C	4	3
$V_{IO\ adj}$	Input Offset Voltage Adjustment Range		$R_{adj} = 5.1\ M\Omega$		1.0		mV	1	1,2,3
I_{IO}	Input Offset Current		$V_{CM} = 0$ V			10	nA	1	1
						20	nA	1	2,3
$\Delta I_{IO}/\Delta T$	Input Offset Current Temperature Sensitivity		$25°C \leqslant T_A \leqslant 125°C$			0.1	nA/°C	4	2
			$-55°C \leqslant T_A \leqslant +25°C$			0.2	nA/°C	4	3
I_{IB}	Input Bias Current		$\pm 5.0\ V \leqslant V_{CC} \leqslant \pm 20$ V, $V_{CM} = 0$ V			68	nA	1	1
						100	nA	1	2,3
Z_I	Input Impedance[7]				1.5		MΩ	1	1
I_{CC}	Supply Current					3.0	mA	1	1
						2.5	mA	1	2
						3.5	mA	1	3
P_c	Power Consumption[8]					120	mW	1	1
						100	mW	1	2
CMR	Common Mode Rejection		$V_{CM} = \pm 15$ V, $R_S = 50\ \Omega$		80		dB	1	1,2,3
V_{IR}	Input Voltage Range[9]				±15		V	1	1,2,3
PSRR	Power Supply Rejection Ratio		$\pm 5.0\ V \leqslant V_{CC} \leqslant \pm 20$ V, $R_S = 50\ \Omega$			100	μV/V	1	1,2,3
I_{OS}	Output Short Circuit Current		$V_{CC} = \pm 15$ V			60	mA	1	1,2,3
A_{VS}	Large Signal Voltage Gain		$V_{CC} = \pm 15$ V, $V_O = \pm 10$ V, $R_L = 2.0\ k\Omega$		50		V/mV	1	4
					25		V/mV	1	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	$V_I = 50$ mV, $R_L = 2.0\ k\Omega$, $C_L = 100$ pF, $A_V = 1.0$			800	ns	3	9, 10, 11
$TR(o_s)$		Overshoot				25	%	3	9, 10, 11
BW	Bandwidth[10]				0.437		MHz	3	9, 10, 11
SR	Slew Rate		$R_L = 2.0\ k\Omega$, $A_V = 1.0$		0.3		V/μs	3	9, 10
					0.2		V/μs	3	11
N_I (BB)	Noise Broadband		BW = 5.0 kHz			15	μV_{rms}	4	9
N_I (PC)	Noise Popcorn		BW = 5.0 kHz			80	μV_{pk}	4	9

Primary Burn-In Circuit
(38510/10103 may be used by FSC as an alternate)



Equivalent Circuit