FAIRCHILD
A Schlumberger Company

MIL-STD-883
July 1986—Rev 1[5]

μA747QB Dual Operational Amplifier

Aerospace and Defense Data Sheet
Linear Products

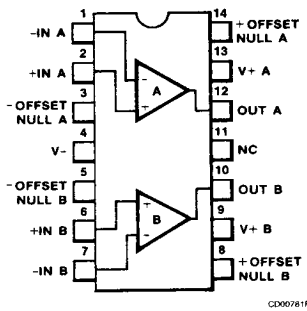
Description

The μA747QB is a pair of high performance monolithic operational amplifiers constructed using the Fairchild Planar Epitaxial process. They are intended for a wide range of analog applications where board space or weight are important. High common mode voltage range and absence of latch-up make the μA747QB ideal for use as a voltage follower. The high gain and wide range of operating voltage provide superior performance in integrator, summing amplifier, and general feedback applications.

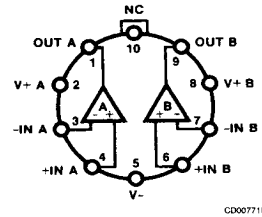
The μA747QB is short circuit protected and requires no external components for frequency compensation. The internal 6 dB/octave roll-off insures stability in closed loop applications.[6]

- **No Frequency Compensation Required**
- **Short Circuit Protection**
- **Offset Voltage Null Capability**
- **Large Common Mode And Differential Voltage Ranges**
- **Low Power Consumption**
- **No Latch-Up**

Connection Diagram 14-Lead DIP (Top View)

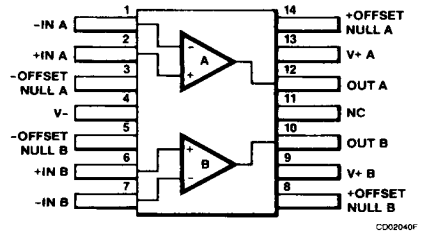


Connection Diagram 10-Lead Can Package (Top View)



Lead 5 connected to case.

Connection Diagram 14-Lead Flatpak (Top View)



Order Information

Part No.	Case/ Finish	Package Code Mil-M-38510, Appendix C
μA747FMQB	AA	F-1 14-Lead Flatpak
μA747DMQB	CA	D-1 14-Lead DIP
μA747HMQB	IC	A-2 10-Lead Can

JAN Product Available

10102	BAA	F-1 14-Lead Flatpak
10102	BAB	F-1 14-Lead Flatpak
10102	BCA	D-1 14-Lead DIP
10102	BCB	D-1 14-Lead DIP
10102	BIA	A-2 10-Lead Can
10102	BIC	A-2 10-Lead Can

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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[12]	
Can and Flatpak	350 mW
DIP	400mW
Supply Voltage	±22 V
Differential Input Voltage	±30 V
Input Voltage[13]	±20 V
Short Circuit Duration[14]	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

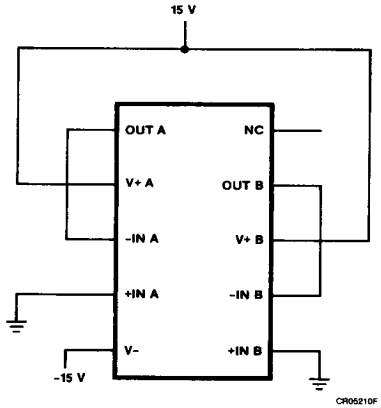
Notes

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. Not available on μA747HMQB.
8. 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.
9. P_c is guaranteed by I_{CC}: $P_c = 30\ I_{CC}$.
10. V_{IR} is guaranteed by the CMR test.
11. BW is guaranteed by t_r: $BW = 0.35/t_r$.
12. Rating applies to ambient temperatures up to 125°C. Above 125°C ambient, derate linearly at 140°C/W for the Can and Flatpak and 120°C/W for the DIP.
13. For supply voltages less than ±20 V, the absolute maximum input voltage is equal to the supply voltage.
14. Short circuit may be to ground or either supply. Rating applies to 125°C case temperature or 75°C ambient temperature.

μA747QB
Electrical Characteristics $V_{CC} = \pm 15$ V, unless otherwise specified.

Symbol	Characteristic		Condition	Min	Max	Unit	Note	Subgrp
V_{IO}	Input Offset Voltage		$R_S = 10\ k\Omega$, $V_{CM} = 0$ V		5.0	mV	1	1
					6.0	mV	1	2,3
$\Delta V_{IO}/\Delta T$	Input Offset Voltage Temperature Sensitivity		$25°C \leqslant T_A \leqslant 125°C$		15	μV/°C	4	2
			$-55°C \leqslant T_A \leqslant +25°C$		15	μV/°C	4	3
$V_{IO\ adj}$	Input Offset Voltage Adjustment Range[7]			5.0		mV	4	1,2,3
I_{IO}	Input Offset Current		$V_{CM} = 0$ V		200	nA	1	1,2
					500	nA	1	3
$\Delta I_{IO}/\Delta T$	Input Offset Current Temperature Sensitivity		$25°C \leqslant T_A \leqslant 125°C$		1.0	nA/°C	4	2
			$-55°C \leqslant T_A \leqslant +25°C$		1.0	nA/°C	4	3
I_{IB}	Input Bias Current		$V_{CM} = 0$ V		340	nA	1	1
					500	nA	1	2
					1500	nA	1	3
Z_I	Input Impedance[8]			0.3		MΩ	1	1
				0.2		MΩ	1	2
I_{CC}	Supply Current (Total)				5.6	mA	1	1
					5.0	mA	1	2
					6.6	mA	1	3
P_c	Power Consumption (Total)[9]				170	mW	1	1
					150	mW	1	2
					200	mW	1	3
CMR	Common Mode Rejection		$V_{CM} = \pm 12$ V, $R_S = 50\ \Omega$	70		dB	1	1,2,3
V_{IR}	Input Voltage Range[10]			±12		V	1	1,2,3
PSRR	Power Supply Rejection Ratio		$V+ = 10$ V, $V- = -20$ V to $V+ = 20$ V, $V- = -10$ V, $R_S = 50\ \Omega$		150	μV/V	1	1,2,3
I_{OS}	Output Short Circuit Current				60	mA	1	1,2,3
A_{VS}	Large Signal Voltage Gain		$V_O = \pm 10$ V, $R_L = 2.0\ k\Omega$	50		V/mV	1	4
				25		V/mV	1	5,6
V_{OP}	Output Voltage Swing		$R_L = 10\ k\Omega$	±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	$V_{CC} = \pm 20$ V, $V_I = 50$ 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[11]			0.437		MHz	3	9, 10, 11
SR	Slew Rate		$V_{CC} = \pm 20$ V, $R_L = 2.0\ k\Omega$, $A_V = 1.0$	0.3		V/μs	3	9, 10, 11
CS	Channel Separation		$V_{CC} = \pm 20$ V	80		dB	1	9
N_I (BB)	Noise Broadband		$V_{CC} = \pm 20$ V, BW = 5.0 kHz		15	μV_{rms}	4	9
N_I (PC)	Noise Popcorn		$V_{CC} = \pm 20$ V, BW = 5.0 kHz		40	μV_{pk}	4	9

Primary Burn-In Circuit
(38510/10102 may be used by FSC as an alternate)



Equivalent Circuit (1/2 of circuit)