FAIRCHILD
A Schlumberger Company

MIL-STD-883
July 1986—Rev 1[5]

μA776QB
Multi-Purpose Programmable Operational Amplifier

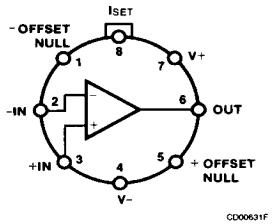
Aerospace and Defense Data Sheet
Linear Products

Description

The μA776QB Programmable Operational Amplifier is constructed using the Fairchild Planar Epitaxial process. High input impedance, low supply currents, and low input noise (over a wide range of operating supply voltages) coupled with programmable electrical characteristics result in an extremely versatile amplifier for use in high accuracy, low power consumption, analog applications. Input noise voltage, noise current, power consumption, and input current can be optimized by a single resistor or current source that sets the chip quiescent current for nanowatt power consumption or for characteristics similar to the μA741QB. Internal frequency compensation, absence of latch-up, high slew rate, and short circuit current protection assure ease of use in long time integrators, active filters, and sample-and-hold circuits.[6]

- **Micropower Consumption**
- **± 1.2 V to ± 18 V Operation**
- **No Frequency Compensation Required**
- **Low Input Bias Currents**
- **Wide Programming Range**
- **High Slew Rate**
- **Low Noise**
- **Short Circuit Protection**
- **Offset Null Capability**
- **No Latch-Up**

Connection Diagram
8-Lead Can
(Top View)



Lead 4 connected to case.

Order Information

Part No.	Case/ Finish	Package Code Mil-M-38510, Appendix C
μA776HMQB	GB	A-1 8-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[10]	
Can	330 mW
Supply Voltage	±18 V
Differential Input Voltage	±30 V
Input Voltage[11]	±15 V
Short Circuit Duration[12]	Indefinite
Voltage Between Offset Null and V−	±0.5 V
I_{SET} (Max Current at I_{SET})	500 μA
V_{SET} (Max Voltage to GND at I_{SET})	(V+ − 2 V) $\leqslant V_{SET} \leqslant$ V+

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. P_{c1} is guaranteed by I_{CC1}: $P_{c1} = 30\ I_{CC1}$.
8. P_{c2} is guaranteed by I_{CC2}: $P_{c2} = 6\ I_{CC2}$.
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.
11. For supply voltages less than ±15 V, the absolute maximum input voltage is equal to the supply voltage.
12. Short circuit may be to ground or either supply. Rating applies to 125°C case temperature or 75°C ambient temperature for $I_{SET} \leqslant 30$ μA.

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

Group C and D Endpoints: Group A, Subgroup 1

μA776QB
Electrical Characteristics $\pm 3.0\ V \leq V_{CC} \leq \pm 15\ V$, $1.5\ \mu A \leq I_{SET} \leq 15\ \mu A$, unless otherwise specified.

Symbol	Characteristic	Condition		Min	Max	Unit	Note	Subgrp
V_{IO}	Input Offset Voltage	$R_S = 50\ \Omega$, $V_{CM} = 0\ V$			5.0	mV	1	1
					6.0	mV	1	2,3
I_{IO}	Input Offset Current	$V_{CM} = 0\ V$	$I_{SET} = 1.5\ \mu A$		3.0	nA	1	1
					5.0	nA	1	2
					10	nA	1	3
			$I_{SET} = 15\ \mu A$		15	nA	1	1,2
					40	nA	1	3
I_{IB}	Input Bias Current	$V_{CM} = 0\ V$	$I_{SET} = 1.5\ \mu A$		7.5	nA	1	1,2
					20	nA	1	3
			$I_{SET} = 15\ \mu A$		50	nA	1	1,2
					120	nA	1	3
I_{CC1}	Supply Current	$V_{CC} = \pm 15\ V$	$I_{SET} = 1.5\ \mu A$		25	μA	1	1
					30	μA	1	2,3
			$I_{SET} = 15\ \mu A$		180	μA	1	1
					200	μA	1	2,3
I_{CC2}	Supply Current	$V_{CC} = \pm 3.0\ V$	$I_{SET} = 1.5\ \mu A$		20	μA	1	1
					25	μA	1	2,3
			$I_{SET} = 15\ \mu A$		160	μA	1	1
					180	μA	1	2,3
P_{c1}	Power Consumption[7]	$V_{CC} = \pm 15\ V$	$I_{SET} = 1.5\ \mu A$		0.75	mW	1	1
					0.9	mW	1	2,3
			$I_{SET} = 15\ \mu A$		5.4	mW	1	1
					6.0	mW	1	2,3
P_{c2}	Power Consumption[8]	$V_{CC} = \pm 3.0\ V$	$I_{SET} = 1.5\ \mu A$		120	μW	1	1
					150	μW	1	2,3
			$I_{SET} = 15\ \mu A$		960	μW	1	1
					1080	μW	1	2,3
CMR	Common Mode Rejection	$V_{CC} = \pm 15\ V$, $V_{CM} = \pm 10\ V$, $R_S = 50\ \Omega$		70		dB	1	1,2,3
		$V_{CC} = \pm 3.0\ V$, $V_{CM} = \pm 1.0\ V$, $R_S = 50\ \Omega$		70		dB	1	1,2,3
V_{IR}	Input Voltage Range[9]	$V_{CC} = \pm 15\ V$		±10		V	1	1,2,3
		$V_{CC} = \pm 3.0\ V$		±1.0		V	1	1,2,3
PSRR	Power Supply Rejection Ratio	$\pm 3.0\ V \leq V_{CC} \leq \pm 18\ V$, $R_S = 50\ \Omega$			150	μV/V	1	1,2,3

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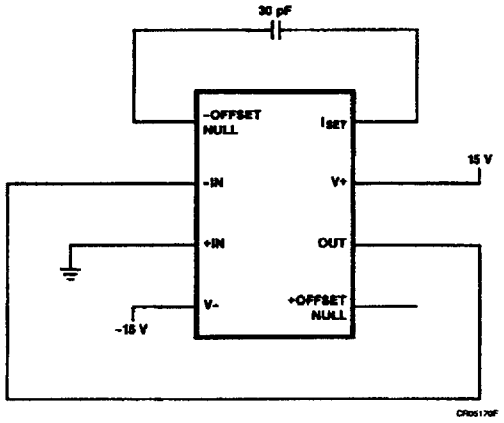
μA776QB (Cont.)
Electrical Characteristics $\pm 3.0\ V \leq V_{CC} \leq \pm 15\ V$, $1.5\ \mu A \leq I_{SET} \leq 15\ \mu A$, unless otherwise specified.

Symbol	Characteristic	Condition		Min	Max	Unit	Note	Subgrp
A_{VS}	Large Signal Voltage Gain	$V_{CC} = \pm 15\ V$, $V_O = \pm 10\ V$	$I_{SET} = 1.5\ \mu A$, $R_L = 75\ k\Omega$	200		V/mV	1	4
				100		V/mV	1	5,6
			$I_{SET} = 15\ \mu A$, $R_L = 75\ k\Omega$	100		V/mV	1	4
				75		V/mV	1	5,6
		$V_{CC} = \pm 3.0\ V$, $V_O = \pm 1.0\ V$	$I_{SET} = 1.5\mu A$, $R_L = 75\ k\Omega$	50		V/mV	1	4
				25		V/mV	1	5,6
			$I_{SET} = 15\ \mu A$, $R_L = 5.0\ k\Omega$	50		V/mV	1	4
				25		V/mV	1	5,6
V_{OP}	Output Voltage Swing	$V_{CC} = \pm 15\ V$, $R_L = 75\ k\Omega$		±12		V	1	4
				±10		V	1	5,6
		$V_{CC} = \pm 3.0\ V$	$I_{SET} = 1.5\ \mu A$, $R_L = 75\ k\Omega$	±2.0		V	1	4,5,6
			$I_{SET} = 15\ \mu A$, $R_L = 5.0\ k\Omega$	±1.9		V	1	4,5,6

Primary Burn-In Circuit



Equivalent Circuit
Refer to the Fairchild Linear Data Book Commercial Section