FAIRCHILD
A Schlumberger Company

μA139QB
Quad Comparator

MIL-STD-883
July 1986—Rev 2[5]

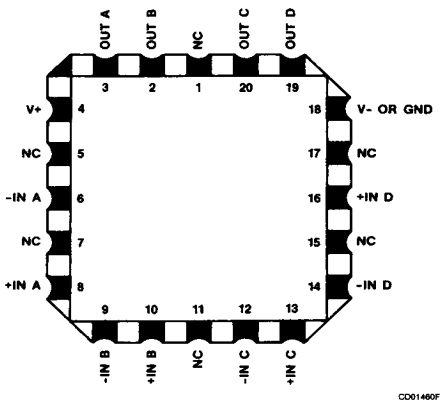
Aerospace and Defense Data Sheet
Linear Products

Description

The μA139QB consists of four independent precision voltage comparators designed specifically to operate from a single power supply. Operation from split power supplies is also possible and the low power supply current drain is independent of the supply voltage range. Darlington connected PNP input stages allow the input common mode voltage to include ground.[6]

- **Single Supply Operation**
- **Dual Supply Operation**
- **Allow Comparison Of Voltages Near Ground Potential**
- **Low Current Drain**
- **Compatible With All Forms Of Logic**
- **Low Input Bias Current**
- **Low Input Offset Current**
- **Low Offset Voltage**

Connection Diagram
20-Terminal CCP
(Top View)



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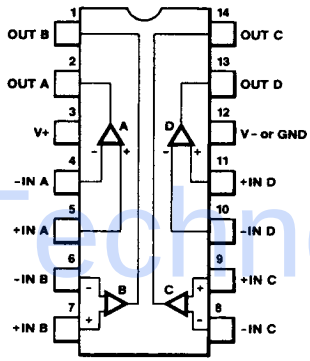
Connection Diagram
14-Lead DIP
(Top View)



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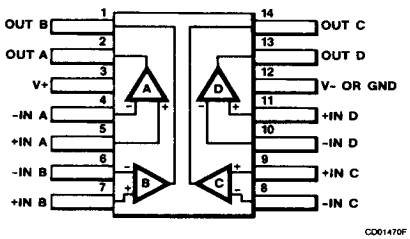
Connection Diagram
14-Lead Flatpak
(Top View)



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Order Information

Part No.	Case/ Finish	Package Code Mil-M-38510, Appendix C
μA139FMQB	AA	F-1 (14-Lead Flatpak)
μA139DMQB	CA	D-1 (14-Lead DIP)
μA139LMQB	2C	C-2 (20-Terminal CCP)

JAN Product Available

11201	BCA	D-1 (14-Lead DIP)
11201	BCB	D-1 (14-Lead DIP)

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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[8]	
Flatpak	350 mW
DIP and CCP	400 mW
Supply Voltage	± 18 V or 36 V
Differential Input Voltage[9]	36 V
Input Voltage[10]	−0.3 V to 36 V
Input Current	10 mA
Short Circuit Duration[11]	Indefinite

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. V_{IR} is guaranteed by the V_{IO} test.
8. Rating applies to ambient temperatures up to 125°C. Above 125°C ambient, derate linearly at 140°C/W for the Flatpak and 120°C/W for the DIP and CCP.
9. The differential input voltage shall not exceed the supply voltage.
10. For supply voltages less than ± 18 V, the absolute maximum input voltage is equal to the supply voltage. The input common mode voltage or either signal input voltage should not be allowed to go negative more than 0.3 V.
11. Short circuit may be to ground or negative supply. Rating applies to 125°C case temperature or 75°C ambient temperature. Short circuit from output to V+ can cause extensive heating and eventual destruction. No more than one amplifier should be shorted at the same time as the maximum junction temperature will be exceeded.

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

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μA139QB

Electrical Characteristics V+ = 5 V, V– = 0 V, unless otherwise specified.

Symbol	Characteristic	Condition		Min	Max	Unit	Note	Subgrp
V_{IO}	Input Offset Voltage	5.0 V ≤ V+ ≤ 36 V, V_O = 1.4 V	0 V ≤ V_{CM} ≤ (V+) – 1.5 V		5.0	mV	1	1
			0 V ≤ V_{CM} ≤ (V+) – 2.0 V		9.0	mV	1	2,3
$\Delta V_{IO}/\Delta T$	Input Offset Voltage Temperature Sensitivity	25°C ≤ T_A ≤ 125°C			25	μV/°C	4	2
		–55°C ≤ T_A ≤ 25°C			25	μV/°C	4	3
I_{IO}	Input Offset Current	V_{CM} = 0 V			25	nA	1	1
					100	nA	1	2,3
$\Delta I_{IO}/\Delta T$	Input Offset Current Temperature Sensitivity	25°C ≤ T_A ≤ 125°C			300	pA/°C	4	2
		–55°C ≤ T_A ≤ 25°C			400	pA/°C	4	3
I_{IB}	Input Bias Current	V_{CM} = 0 V		–100		nA	1	1
				–300		nA	1	2,3
I_{CC}	Supply Current (Total)	V_{CC} = 5.0 V			2.0	mA	1	1,2
					3.0	mA	1	3
		V_{CC} = 30 V			3.0	mA	1	1,2
					4.0	mA	1	3
CMR	Common Mode Rejection	V+ = 30 V, R_S = 50 Ω, V_{CM} = 28 V		76		dB	4	1,2,3
V_{IR}	Input Voltage Range	5.0 V ≤ V+ ≤ 36 V, V_O = 1.4 V		0	V+ –1.5	V	7	1
				0	V+ –2	V	7	2,3
I_{CEX}	Output Leakage Current	V_I+ = 1.0 V, V_I– = 0 V, V_O = 30 V			200	nA	1	1
					1.0	μA	1	2,3
I_{IL} (±)	Input Leakage Current	V_{CC}+ = 36 V, V_I+ = 34 V, 0V V_I– = 0V, 34 V		–500	500	ns	4	1,2,3
I_{OL}	Output Sink Current	V_I+ = 0 V, V_I– = 1.0 V, V_O = 1.5 V		6.0		mA	1	1
V_{LAT}	Voltage Latch (High Level Input)	V_I+ = 0 V, V_I– = 10 V, I_{OL} = 4 mA			400	mV	3	1
V_{OL}	Low Level Output Voltage	V_I+ = 0 V, V_I– = 1.0 V, I_{OL} = 4.0 mA			400	mV	1	1
					700	mV	1	2,3
A_{VS}	Large Signal Voltage Gain	V+ = 15 V, R_L = 15 kΩ		25		V/mV	4	4,5,6
CS	Channel Separation	V+ = 30 V		80		dB	4	9
t_{PLH}	Propagation Delay to High Level	V_I = 100 mV, R_L = 5.1 kΩ	V_{OD} = 5.0 mV		7.0	μs	3	10
					5.0	μs	3	9,11
			V_{OD} = 50 mV		1.2	μs	3	10
					0.8	μs	3	9,11
t_{PHL}	Propagation Delay to Low Level	V_I = 100 mV, R_L = 5.1 kΩ	V_{OD} = 5.0 mV		3.0	μs	3	10
					2.5	μs	3	9,11
			V_{OD} = 50 mV		1.0	μs	3	10
					0.8	μs	3	9,11

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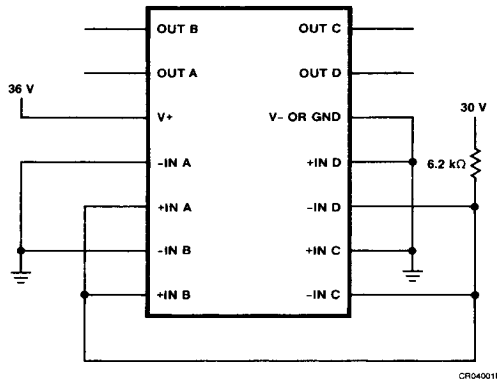
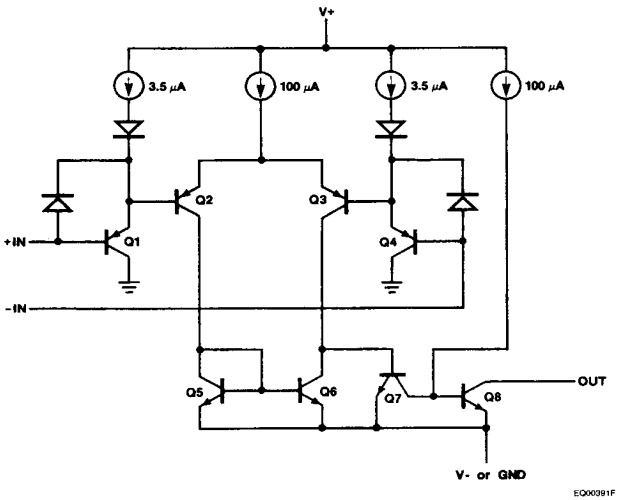
Primary Burn-In Circuit
(38510/11201 may be used by FSC as an alternate)



Equivalent Circuit (1/4 of circuit)



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