

# μA710

## HIGH SPEED DIFFERENTIAL COMPARATOR

### FAIRCHILD LINEAR INTEGRATED CIRCUIT

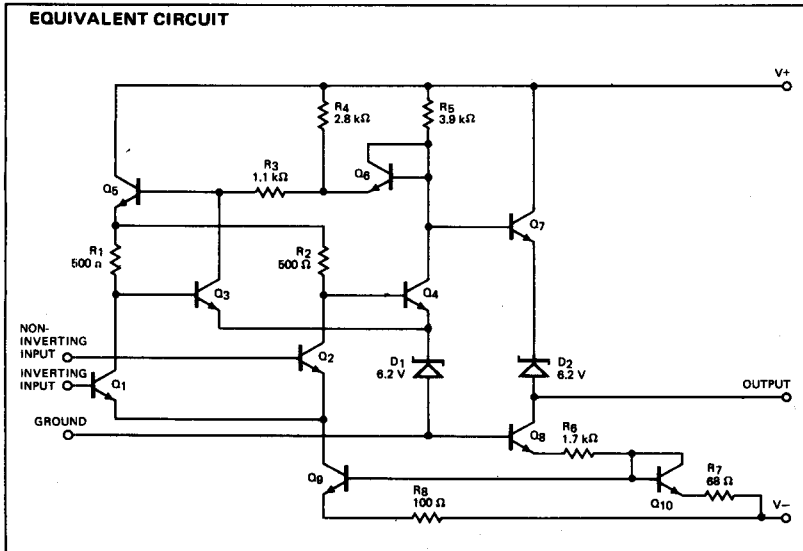
**GENERAL DESCRIPTION** — The μA710 is a Differential Voltage Comparator intended for applications requiring high accuracy and fast response times. It is constructed on a single silicon chip using the Fairchild Planar\* epitaxial process. The device is useful as a variable threshold Schmitt trigger, a pulse height discriminator, a voltage comparator in high speed A/D converters, a memory sense amplifier or a high noise immunity line receiver. The output of the comparator is compatible with all integrated logic forms.

- 5 mV MAXIMUM OFFSET VOLTAGE
- 5 μA MAXIMUM OFFSET CURRENT
- 1000 MINIMUM VOLTAGE GAIN
- 20 μV/°C MAXIMUM OFFSET VOLTAGE DRIFT

#### ABSOLUTE MAXIMUM RATINGS

Positive Supply Voltage	+14.0 V
Negative Supply Voltage	-7.0 V
Peak Output Current	10 mA
Differential Input Voltage	±5.0 V
Input Voltage	±7.0 V
Internal Power Dissipation (Note 1)	
Metal Can	500 mW
DIP	670 mW
Flatpak	570 mW
Storage Temperature Range	
Metal Can, Hermetic DIP and Flatpak	-65°C to +150°C
Molded DIP	-55°C to +125°C
Operating Temperature Range	
Military (μA710)	-55°C to +125°C
Commercial (μA710C)	0°C to +70°C
Lead Temperature	
Metal Can, Hermetic DIP and Flatpak (Soldering, 60 s)	300°C
Molded DIP (Soldering, 10 s)	260°C

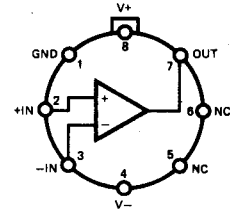
#### EQUIVALENT CIRCUIT



Notes on following pages.

#### CONNECTION DIAGRAMS

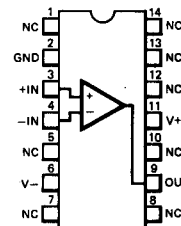
##### 8-LEAD METAL CAN (TOP VIEW) PACKAGE OUTLINE 5S PACKAGE CODE H



NOTE: Pin 4 connected to case.

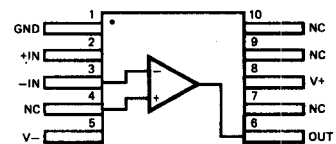
ORDER INFORMATION	
TYPE	PART NO.
μA710	μA710HM
μA710C	μA710HC

##### 14-LEAD DIP (TOP VIEW) PACKAGE OUTLINES 6A 9A PACKAGE CODES D P



ORDER INFORMATION	
TYPE	PART NO.
μA710	μA710DM
μA710C	μA710DC
μA710C	μA710PC

##### 10-LEAD FLATPAK (TOP VIEW) PACKAGE OUTLINE 3F PACKAGE CODE F



ORDER INFORMATION	
TYPE	PART NO.
μA710	μA710FM

\*Planar is a patented Fairchild process.

**FAIRCHILD LINEAR INTEGRATED CIRCUITS •  $\mu A710$**

**$\mu A710$**

**ELECTRICAL CHARACTERISTICS ( $T_A = +25^\circ C$ ,  $V_+ = 12.0 V$ ,  $V_- = -6.0 V$  unless otherwise specified)**

PARAMETER	CONDITIONS (Note 2)	MIN	TYP	MAX	UNITS
Input Offset Voltage	$R_S < 200 \Omega$		0.6	2.0	mV
Input Offset Current			0.75	3.0	$\mu A$
Input Bias Current			13	20	$\mu A$
Voltage Gain		1250	1700		
Output Resistance			200		$\Omega$
Output Sink Current	$\Delta V_{IN} > 5 mV$ , $V_{OUT} = 0$	2.0	2.5		mA
Response Time (Note 3)			40		ns

The following specifications apply for  $-55^\circ C < T_A < +125^\circ C$ :

Input Offset Voltage	$R_S < 200 \Omega$			3.0	mV
Average Temperature Coefficient of Input Offset Voltage	$R_S = 50 \Omega$ , $T_A = 25^\circ C$ to $T_A = +125^\circ C$		3.5	10	$\mu V/^\circ C$
	$R_S = 50 \Omega$ , $T_A = 25^\circ C$ to $T_A = -55^\circ C$		2.7	10	$\mu V/^\circ C$
Input Offset Current	$T_A = +125^\circ C$		0.25	3.0	$\mu A$
	$T_A = -55^\circ C$		1.8	7.0	$\mu A$
Average Temperature Coefficient of Input Offset Current	$T_A = 25^\circ C$ to $T_A = +125^\circ C$		5.0	25	nA/°C
	$T_A = 25^\circ C$ to $T_A = -55^\circ C$		15	75	nA/°C
Input Bias Current	$T_A = -55^\circ C$		27	45	$\mu A$
Input Voltage Range	$V_- = -7.0 V$	$\pm 5.0$			V
Common Mode Rejection Ratio	$R_S < 200 \Omega$	80	100		dB
Differential Input Voltage Range		$\pm 5.0$			V
Voltage Gain		1000			
Output HIGH Voltage	$\Delta V_{IN} > 5 mV$ , $0 < I_{OUT} < 5.0 mA$	2.5	3.2	4.0	V
Output LOW Voltage	$\Delta V_{IN} > 5 mV$	-1.0	-0.5	0	V
Output Sink Current	$T_A = +125^\circ C$ , $\Delta V_{IN} > 5 mV$ , $V_{OUT} = 0$	0.5	1.7		mA
	$T_A = -55^\circ C$ , $\Delta V_{IN} > 5 mV$ , $V_{OUT} = 0$	1.0	2.3		mA
Positive Supply Current	$V_{OUT} < 0$		5.2	9.0	mA
Negative Supply Current	$V_{OUT} = Gnd$ , Inverting Input = +5 mV		4.6	7.0	mA
Power Consumption	$V_{OUT} = Gnd$ , Inverting Input = +10 mV		90	150	mW

**$\mu A710C$**

**ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ C$ ,  $V_+ = 12.0 V$ ,  $V_- = -6.0 V$  unless otherwise specified)**

PARAMETER	CONDITIONS (Note 2)	MIN	TYP	MAX	UNITS
Input Offset Voltage	$R_S < 200 \Omega$		1.6	5.0	mV
Input Offset Current			1.8	5.0	$\mu A$
Input Bias Current			16	25	$\mu A$
Voltage Gain		1000	1500		
Output Resistance			200		$\Omega$
Output Sink Current	$\Delta V_{IN} > 5 mV$ , $V_{OUT} = 0$	1.6	2.5		mA
Response Time (Note 2)			40		ns

The following specifications apply for  $0^\circ C < T_A < +70^\circ C$ :

Input Offset Voltage	$R_S < 200 \Omega$			6.5	mV
Average Temperature Coefficient of Input Offset Voltage	$R_S = 50 \Omega$ , $T_A = 0^\circ C$ to $T_A = +70^\circ C$		5.0	20	$\mu V/^\circ C$
Input Offset Current				7.5	$\mu A$
Average Temperature Coefficient of Input Offset Current	$T_A = 25^\circ C$ to $T_A = +70^\circ C$		15	50	nA/°C
	$T_A = 25^\circ C$ to $T_A = 0^\circ C$		24	100	nA/°C
Input Bias Current	$T_A = 0^\circ C$		25	40	$\mu A$
Input Voltage Range	$V_- = -7.0 V$	$\pm 5.0$			V
Common Mode Rejection Ratio	$R_S < 200 \Omega$	70	98		dB
Differential Input Voltage Range		$\pm 5.0$			V
Voltage Gain		800			
Output HIGH Voltage	$\Delta V_{IN} > 5 mV$ , $0 < I_{OUT} < 5.0 mA$	2.5	3.2	4.0	V
Output LOW Voltage	$\Delta V_{IN} > 5 mV$	-1.0	-0.5	0	V
Output Sink Current	$\Delta V_{IN} > 5 mV$ , $V_{OUT} = 0$	0.5			mA
Positive Supply Current	$V_{OUT} < 0$		5.2	9.0	mA
Negative Supply Current	$V_{OUT} = Gnd$ , Inverting Input = +5 mV		4.6	7.0	mA
Power Consumption	$V_{OUT} = Gnd$ , Inverting Input = +10 mV		90	150	mW

**NOTES:**

- Rating applies to ambient temperatures up to  $70^\circ C$ . Above  $70^\circ C$  ambient derate linearly at  $6.3 mW/^\circ C$  for Metal Can,  $8.3 mW/^\circ C$  for DIP, and  $7.1 mW/^\circ C$  for the Flatpak.
- The input offset voltage and input offset current (see definitions) are specified for a logic threshold voltage as follows: For 710, 1.8 V at  $-55^\circ C$ , 1.4 V at  $+25^\circ C$ , 1.0 V at  $+125^\circ C$ . For 710C, 1.5 V at  $0^\circ C$ , 1.4 V at  $+25^\circ C$ , and 1.2 V at  $+70^\circ C$ .
- The response time specified (see definitions) is for a 100 mV input step with 5 mV overdrive.

TYPICAL PERFORMANCE CURVES FOR  $\mu$ A710

