μA710
HIGH SPEED DIFFERENTIAL COMPARATOR
FAIRCHILD LINEAR INTEGRATED CIRCUIT

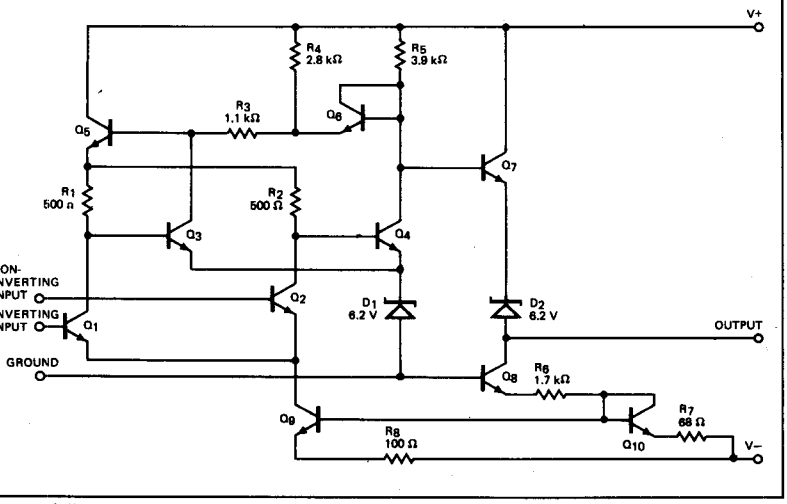
GENERAL DESCRIPTION – The μA710 is a Differential Voltage Comparator intended for applications requiring high accuracy and fast response times. It is constructed on a single silicon chip using the Fairchild Planar* epitaxial process. The device is useful as a variable threshold Schmitt trigger, a pulse 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 Ouput 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

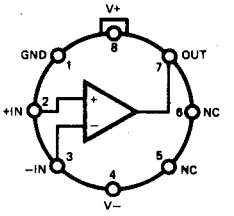
EQUIVALENT CIRCUIT



Notes on following pages.

CONNECTION DIAGRAMS

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

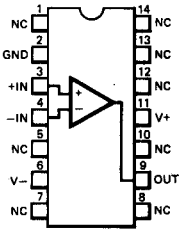


NOTE: Pin 4 connected to case.

ORDER INFORMATION

TYPE	PART NO.
μA710	μA710HM
μA710C	μA710HC

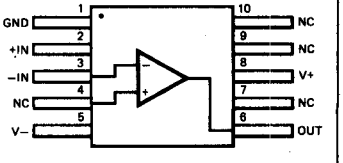
14-LEAD DIP
(TOP VIEW)
PACKAGE OUTLINES 6A 9A
PACKAGE CODES D P



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.

μA710

ELECTRICAL CHARACTERISTICS (T_A = +25°C, V+ = 12.0 V, V− = −6.0 V unless otherwise specified)

PARAMETER	CONDITIONS (Note 2)	MIN	TYP	MAX	UNITS
Input Offset Voltage	$R_S \leq 200\ \Omega$		0.6	2.0	mV
Input Offset Current			0.75	3.0	μA
Input Bias Current			13	20	μA
Voltage Gain		1250	1700		
Output Resistance			200		Ω
Output Sink Current	$\Delta V_{IN} \geq 5$ mV, $V_{OUT} = 0$	2.0	2.5		mA
Response Time (Note 3)			40		ns
The following specifications apply for −55°C ≤ T_A ≤ +125°C:					
Input Offset Voltage	$R_S \leq 200\ \Omega$			3.0	mV
Average Temperature Coefficient of Input Offset Voltage	$R_S = 50\ \Omega$, T_A = 25°C to T_A = +125°C		3.5	10	μV/°C
	$R_S = 50\ \Omega$, T_A = 25°C to T_A = −55°C		2.7	10	μV/°C
Input Offset Current	T_A = +125°C		0.25	3.0	μA
	T_A = −55°C		1.8	7.0	μA
Average Temperature Coefficient of Input Offset Current	T_A = 25°C to T_A = +125°C		5.0	25	nA/°C
	T_A = 25°C to T_A = −55°C		15	75	nA/°C
Input Bias Current	T_A = −55°C		27	45	μA
Input Voltage Range	V− = −7.0 V	±5.0			V
Common Mode Rejection Ratio	$R_S \leq 200\ \Omega$	80	100		dB
Differential Input Voltage Range		±5.0			V
Voltage Gain		1000			
Output HIGH Voltage	$\Delta V_{IN} \geq 5$ mV, $0 \leq I_{OUT} \leq 5.0$ mA	2.5	3.2	4.0	V
Output LOW Voltage	$\Delta V_{IN} \geq 5$ mV	−1.0	−0.5	0	V
Output Sink Current	T_A = +125°C, $\Delta V_{IN} \geq 5$ mV, $V_{OUT} = 0$	0.5	1.7		mA
	T_A = −55°C, $\Delta V_{IN} \geq 5$ mV, $V_{OUT} = 0$	1.0	2.3		mA
Positive Supply Current	$V_{OUT} \leq 0$		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

μA710C

ELECTRICAL CHARACTERISTICS (T_A = 25°C, V+ = 12.0 V, V− = −6.0 V unless otherwise specified)

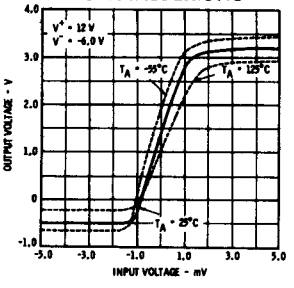
PARAMETER	CONDITIONS (Note 2)	MIN	TYP	MAX	UNITS
Input Offset Voltage	$R_S \leq 200\ \Omega$		1.6	5.0	mV
Input Offset Current			1.8	5.0	μA
Input Bias Current			16	25	μA
Voltage Gain		1000	1500		
Output Resistance			200		Ω
Output Sink Current	$\Delta V_{IN} \geq 5$ mV, $V_{OUT} = 0$	1.6	2.5		mA
Response Time (Note 2)			40		ns
The following specifications apply for 0°C ≤ T_A ≤ +70°C:					
Input Offset Voltage	$R_S \leq 200\ \Omega$			6.5	mV
Average Temperature Coefficient of Input Offset Voltage	$R_S = 50\ \Omega$, T_A = 0°C to T_A = +70°C		5.0	20	μV/°C
Input Offset Current				7.5	μA
Average Temperature Coefficient of Input Offset Current	T_A = 25°C to T_A = +70°C		15	50	nA/°C
	T_A = 25°C to T_A = 0°C		24	100	nA/°C
Input Bias Current	T_A = 0°C		25	40	μA
Input Voltage Range	V− = −7.0 V	±5.0			V
Common Mode Rejection Ratio	$R_S \leq 200\ \Omega$	70	98		dB
Differential Input Voltage Range		±5.0			V
Voltage Gain		800			
Output HIGH Voltage	$\Delta V_{IN} \geq 5$ mV, $0 \leq I_{OUT} \leq 5.0$ mA	2.5	3.2	4.0	V
Output LOW Voltage	$\Delta V_{IN} \geq 5$ mV	−1.0	−0.5	0	V
Output Sink Current	$\Delta V_{IN} \geq 5$ mV, $V_{OUT} = 0$	0.5			mA
Positive Supply Current	$V_{OUT} \leq 0$		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:

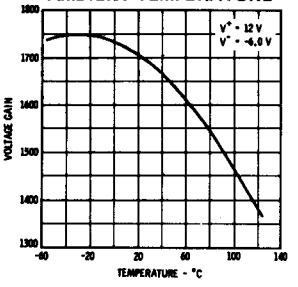
1. Rating applies to ambient temperatures up to 70°C. Above 70°C ambient derate linearly at 6.3 mW/°C for Metal Can, 8.3 mW/°C for DIP, and 7.1 mW/°C for the Flatpak.
2. The input offset voltage and input offset current (see definitions) are specified for a logic threshold voltage as follows: For 710,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

TYPICAL PERFORMANCE CURVES FOR μA710

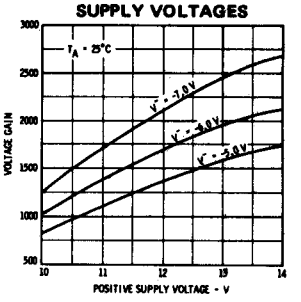
VOLTAGE TRANSFER CHARACTERISTIC



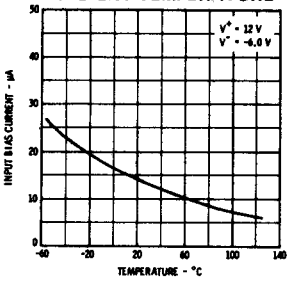
VOLTAGE GAIN AS A FUNCTION OF AMBIENT TEMPERATURE



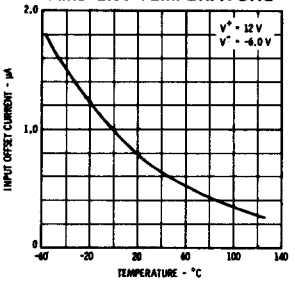
VOLTAGE GAIN AS A FUNCTION OF SUPPLY VOLTAGES



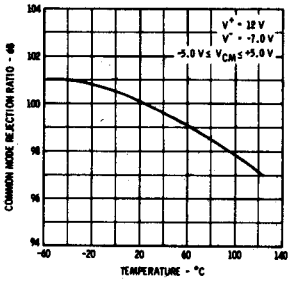
INPUT BIAS CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE



INPUT OFFSET CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE



COMMON MODE REJECTION RATIO AS A FUNCTION OF AMBIENT TEMPERATURE



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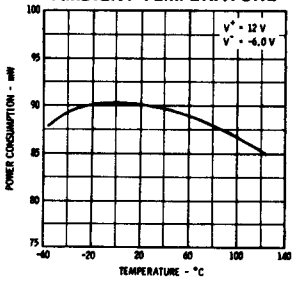
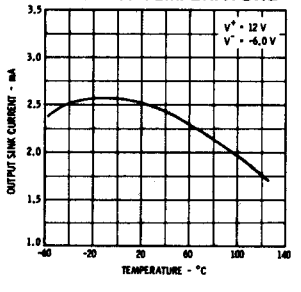
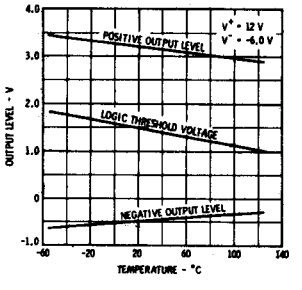
POWER CONSUMPTION AS A FUNCTION OF AMBIENT TEMPERATURE



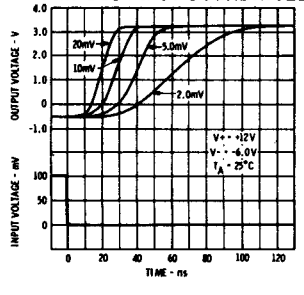
OUTPUT SINK CURRENT AS A FUNCTION OF AMBIENT TEMPERATURE



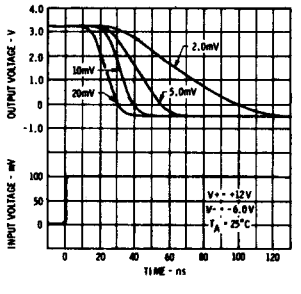
OUTPUT VOLTAGE LEVELS AS A FUNCTION OF AMBIENT TEMPERATURE



RESPONSE TIME FOR VARIOUS INPUT OVERDRIVES



RESPONSE TIME FOR VARIOUS INPUT OVERDRIVES



COMMON MODE PULSE RESPONSE