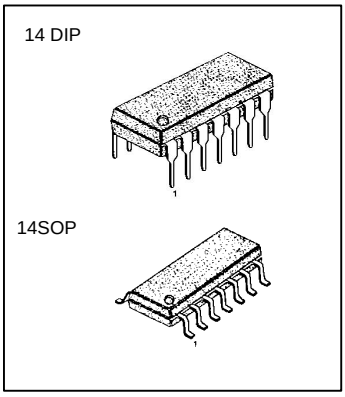
HIGH SPEED VOLTAGE COMPARATOR

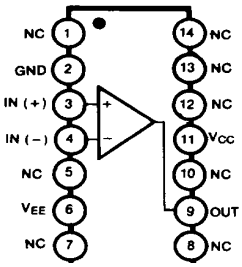
The LM710/I is a high speed voltage comparator intended for use as an accurate, low-level digital level sensor or as a replacement for operational amplifiers in comparator applications where speed is of prime importance.
The output of the comparator is compatible with all integrated logic forms.
The LM710/I is useful as pulse height discriminators. a variable threshold Schmitt trigger, voltage comparator in high-speed A/D converters, a memory sense amplifier or a high noise immunity line receiver.



FEATURES

- Low offset voltage: 5mV
- High gain: 1000 V/V
- High speed: 40ns Typ

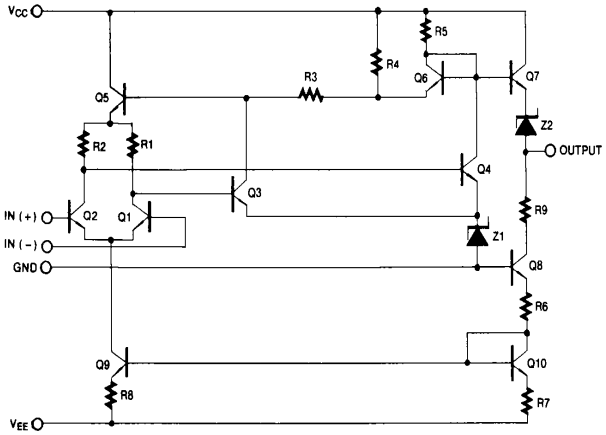
BLOCK DIAGRAM



ORDERING INFORMATION

Device	Package	Operating Temperature
LM710N	14 DIP	0 ~ 70°C
LM710M	14 SOP	
LM710IN	14 DIP	-25 ~ 85°C
LM710IM	14 SOP	

SCHEMATIC DIAGRM



FAIRCHILD SEMICONDUCTOR TM

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Positive Supply Voltage	V_{CC}	+14	V
Negative Supply Voltage	V_{EE}	-7	V
Peak Output Current	I_{PK}	10	mA
Output Short Circuit Duration		10	Sec
Differential Input Voltage	$V_{I(DIFF)}$	5	V
Input Voltage	V_I	± 7	V
Power Dissipation	P_D	500	mW
Operating Temperature Range LM710	T_{STG}	0 ~ + 70	°C
LM710I		- 25 ~ + 85	°C
Storage Temperature Range	T_{STG}	- 65 ~ + 150	°C

ELECTRICAL CHARACTERISTICS (V_{CC} = +12V, V_{EE}= -6V, T = 25°C, unless otherwise specified)

Characteristics	Symbol	Test Conditions	LM710I			LM710			UNIT
			Min	Typ	Max	Min	Typ	Max	
Input Offset voltage	V_{IO}	R_S≤200Ω, Note1		0.6	2.0		1.6	5.0	mV
		Note 2			3.0			6.5	
Input Offset Current (Note 1)	I_{IO}	NOTE 1		0.75	3.0		1.8	5.0	nA
		Note 2		1.8	7.0			7.5	
Input Bias Current	I_{BIAS}			5.0	20		7.0	25	nA
		Note 2		27	45		25	40	
Large Signal Voltage Gain	G_v		1250	1800		1000	1700		V/V
		Note 2							
Input Voltage Range	$V_{I(R)}$	V_{CC} = -7V	± 5.0			± 5.0			V
Common Mode Rejection Ratio	CMRR	R_S≤200Ω, NOTE 2	80	95		70	94		dB
Differential Input Voltage Range	$V_{ID(R)}$		± 5.0			± 5.0			V
Positive Output Level	$V_{O(H)}$	0 ≤ I_O ≤5mA, V_I ≥ 5mV	2.5	2.9	4.0	2.5	2.9	4.0	V
Negative Output Level	$V_{O(L)}$	V_I≥5mV	-1.0	-0.5	0	-1.0	-0.5	0	V
Output Sink Current	I_{SINK}	$V_{O(P)}$ =0V, V_I ≥ 5mV	2.0	2.2		1.6	2.2		mA
Positive Supply Current	I_{CC}	$V_{O(P)}$ ≤ 0V		4.7	9.0		4.7	9.0	mA
Negative Supply Current	I_{EE}	$V_{O(P)}$ = 0V, V_I = 5mV		4.0	7.0		4.0	7.0	mA
Power Consumption	P_D	$V_{O(P)}$ = 0V, V_I =10mV		80	150			150	mV
Response Time	t_{RES}	(Note 3)		40			40		ns

Note 1. The input offset voltage and input offset current are specified for a logic threshold voltage as follows:
For 710I, 1.65V at -25°C, 1.4V at +25°C, 1.15V at +85°C. For 710, 1.5V at 0°C, 1.4V at +25°C, 1.2V at +70°C.
Note 2. LM710: 0≤ TA≤ +70°C
LM710I:-25≤ TA≤ +85°C
Note 3. The response time specified is a 100mV input step with 5mV overdrive (LM710).

TYPICAL PERFORMANCE CHARACTERISTICS

Fig. 1 SUPPLY CURRENT

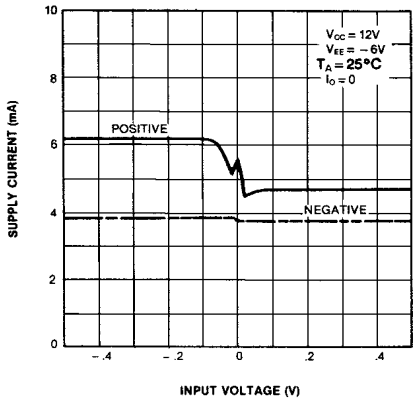


Fig. 2 VOLTAGE GAIN

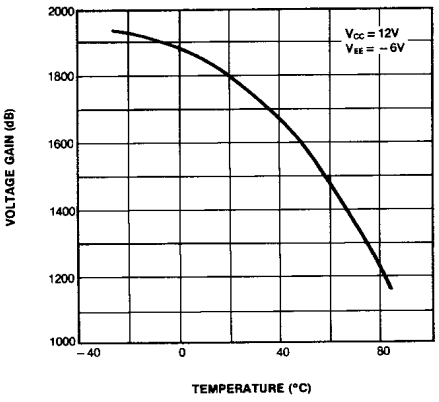


Fig. 3 INPUT OFFSET CURRENT

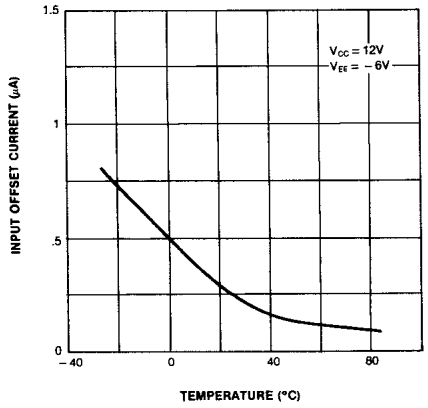


Fig. 4 INPUT BIAS CURRENT

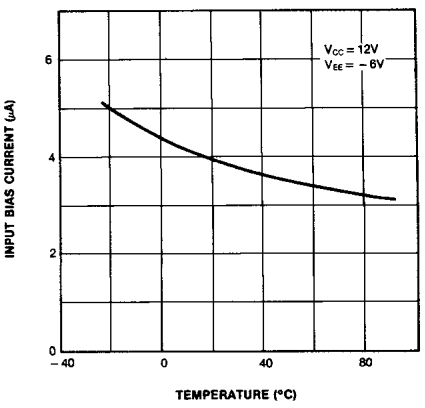


Fig. 5 OUTPUT VOLTAGE LEVEL

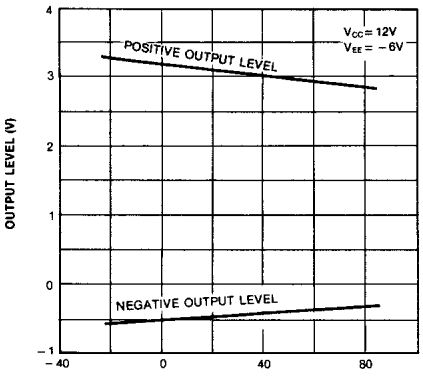
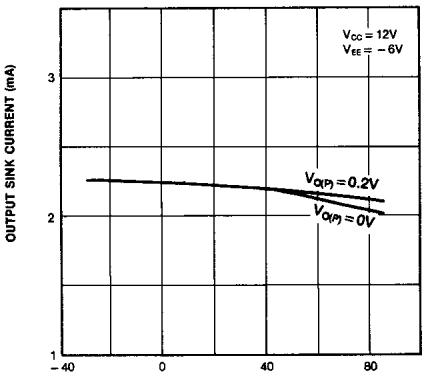


Fig. 6 OUTPUT SINK CURRENT



TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACEx™
CoolFET™
CROSSVOLT™
E^2CMOS^{TM}
FACT™
FACT Quiet Series™
FAST®
FASTr™
GTO™
HiSeC™
ISOPLANAR™
MICROWIRE™
POP™
PowerTrench™
QS™
Quiet Series™
SuperSOT™-3
SuperSOT™-6
SuperSOT™-8
TinyLogic™

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.
As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.