

## 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.

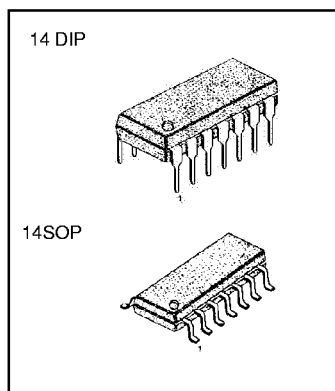
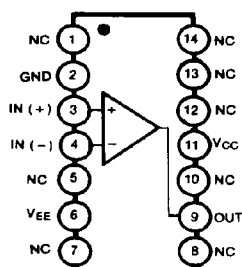
The output of the comparator is compatible with all integrated logic forms.

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

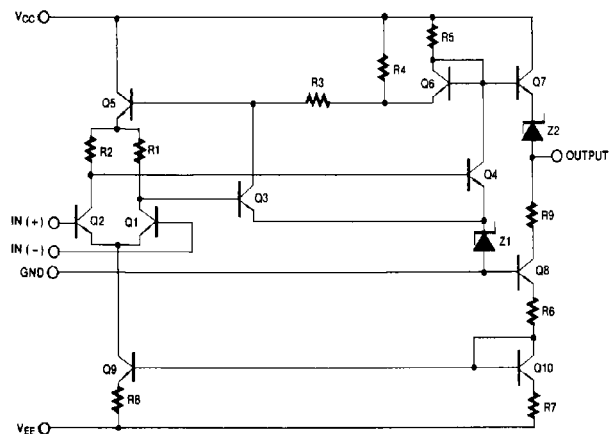
## BLOCK DIAGRAM



## 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



## 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	$V_I$	$\pm 7$	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 ( $V_{CC} = +12V$ ,  $V_{EE} = -6V$ ,  $T = 25^\circ C$ , unless otherwise specified)

Characteristics	Symbol	Test Conditions	LM710I			LM710			UNIT
			Min	Typ	Max	Min	Typ	Max	
Input Offset voltage	$V_{IO}$	$R_S \leq 200\Omega$ , Note 1		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	$V_{I(R)}$	$V_{CC} = -7V$	$\pm 5.0$			$\pm 5.0$			V
Common Mode Rejection Ratio	CMRR	$R_S \leq 200\Omega$ , NOTE 2	80	95		70	94		dB
Differential Input Voltage Range	$V_{ID(R)}$		$\pm 5.0$			$\pm 5.0$			V
Positive Output Level	$V_{O(H)}$	$0 \leq I_O \leq 5mA$ , $V_I \geq 5mV$	2.5	2.9	4.0	2.5	2.9	4.0	V
Negative Output Level	$V_{O(L)}$	$V_I \geq 5mV$	-1.0	-0.5	0	-1.0	-0.5	0	V
Output Sink Current	$I_{SINK}$	$V_{O(P)} = 0V$ , $V_I \geq 5mV$	2.0	2.2		1.6	2.2		mA
Positive Supply Current	$I_{CC}$	$V_{O(P)} \leq 0V$		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	mW
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:  $0 \leq T_A \leq +70^\circ C$

LM710I:  $-25 \leq T_A \leq +85^\circ C$

Note 3. The response time specified is a 100mV input step with 5mV overdrive (LM710).

## TYPICAL PERFORMANCE CHARACTERISTICS

Fig. 1 SUPPLY CURRENT

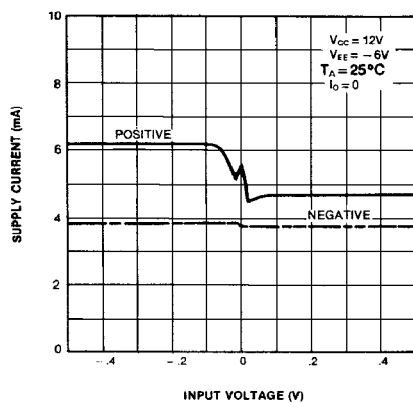


Fig. 2 VOLTAGE GAIN

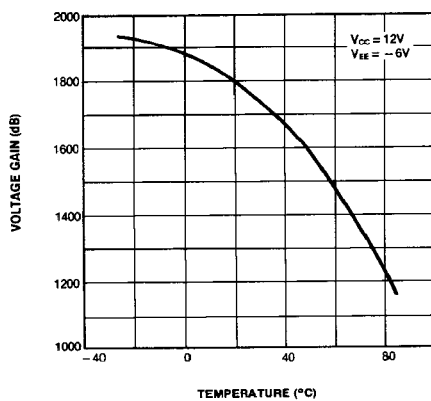


Fig. 3 INPUT OFFSET CURRENT

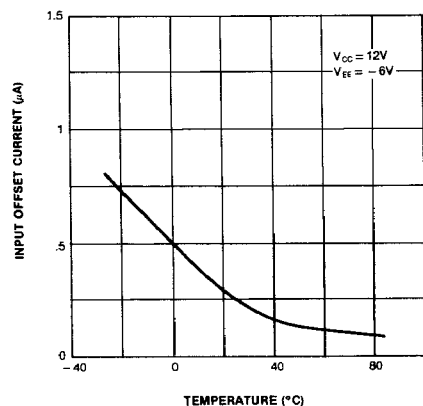


Fig. 4 INPUT BIAS CURRENT

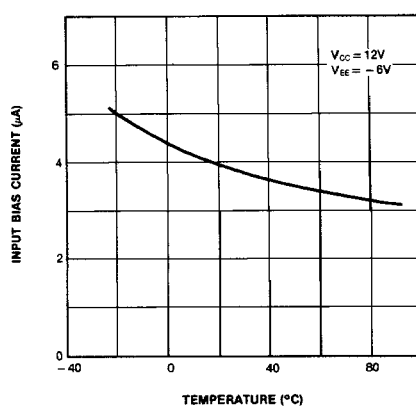


Fig. 5 OUTPUT VOLTAGE LEVEL

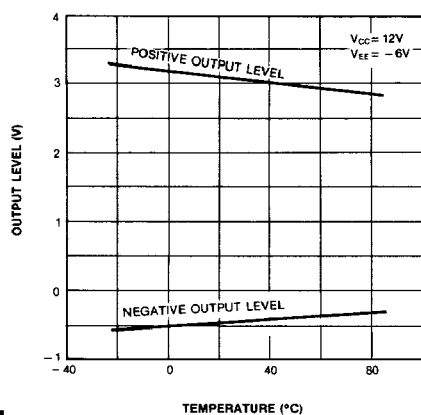
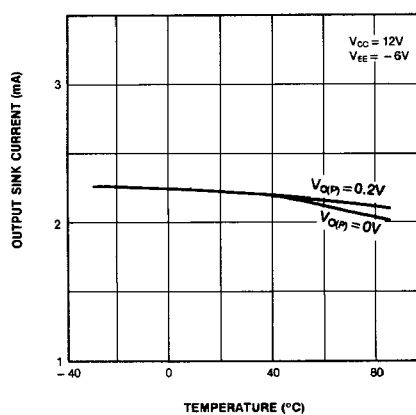


Fig. 6 OUTPUT SINK CURRENT



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