signetics DIFFERENTIAL VOLTAGE COMPARATOR | μA710

LINEAR INTEGRATED CIRCUITS

DESCRIPTION

The μA710 is a High Speed Differential Voltage Comparator featuring low offset voltage, high sensitivity and a wide input voltage range. It is ideally suited for use as a pulse height discriminator, an analog comparator or a digital line receiver. The output structure of the μA710 is compatible with DTL, TTL and Utilogic integrated circuits.

The μA710 is specified for operation over the MIL temperature range of -55°C to +125°C. The μA710C is specified for operation over the commercial/industrial temperature range of 0°C to +75°C.

FEATURES

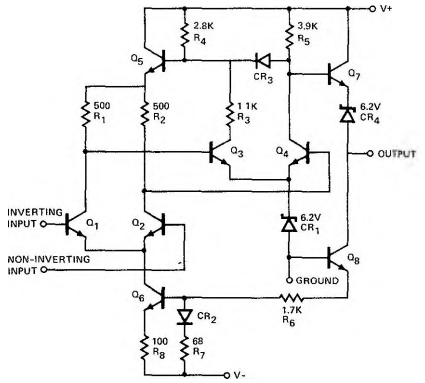
- **FAST RESPONSE – 40ns**
- **HIGH SENSITIVITY – 1.7V/mv**
- **LOW OFFSET VOLTAGE TEMPERATURE COEFFICIENT – 3.5μV/°C**
- **HIGH INPUT VOLTAGE RANGE – ±5.0V**

ABSOLUTE MAXIMUM RATINGS

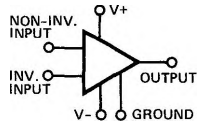
Positive Supply Voltage	+14.0V
Negative Supply Voltage	-7.0V
Peak Output Current	10mA
Differential Input Voltage	±5.0V
Input Voltage	±7.0V
Internal Power Dissipation (Note 4)	
TO-99	300mW
TO-91	200mW
Operating Temperature Range	
μA710	-55°C to +125°C
μA710C	0°C to +75°C
Storage Temperature Range	-65°C to +150°C
Lead Temperature (Soldering, 60 sec)	300°C

Maximum Ratings are limiting values above which serviceability may be impaired.

BASIC CIRCUIT SCHEMATIC

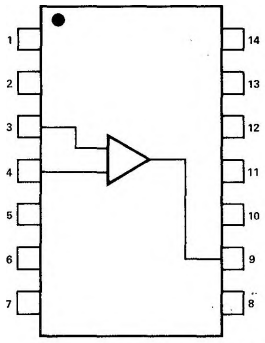


PIN CONFIGURATION



A PACKAGE

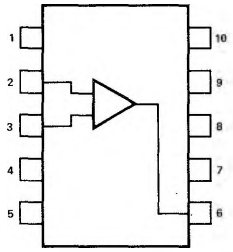
(Top View)



1. NC
2. Ground
3. Non-Inverting Input
4. Inverting Input
5. NC
6. V^-
7. NC
8. NC
9. Output
10. NC
11. V^+
12. NC
13. NC
14. NC

ORDER PART NOS. μA710A/μA710CA

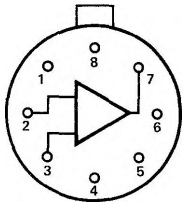
G PACKAGE



1. Ground
2. Non-Inverting Input
3. Inverting Input
4. NC
5. V^-
6. Output
7. NC
8. V^+
9. NC
10. NC

ORDER PART NOS. μA710G/μA710CG

T PACKAGE



1. Ground
2. Non-Inverting Input
3. Inverting Input
4. V^-
5. NC
6. NC
7. Output
8. V^+

ORDER PART NOS. μA710T/μA710CT

ELECTRICAL CHARACTERISTICS (Note 1)

(Standard Conditions: T_A = +25°C, V^+ = 12V, V^- = -6.0V unless otherwise specified)

PARAMETERS	TEST CONDITIONS	MIN		TYP		MAX		UNITS
		μA710	μA710C	μA710	μA710C	μA710	μA710C	
Input Offset Voltage	$R_S \leq 200\Omega$ Note 3			0.6	1.6	2.0	5.0	mV
Input Offset Current	Note 3			0.75	1.8	3.0	5.0	μA
Input Bias Current				13	16	20	25	μA
Voltage Gain		1250	1000	1700	1500			
Output Resistance				200	200			Ω
Output Sink Current	$\Delta V_{in} \geq 5mV$, $V_{out} = 0$	2.0	1.6	2.5				mA
Response Time	Note 2			40	40			ns
Except as noted, the following specifications apply over the temperature ranges of:		$-55°C \leq T_A \leq +125°C$ for the S5710						
		$0°C \leq T_A \leq +75°C$ for the N5710						
Input Offset Voltage	$R_S \leq 200\Omega$ Note 3					3.0	6.5	
Average Temperature Coefficient of Input Offset Voltage	$R_S = 50\Omega$, T_A = +25°C to +125°C			3.5		10		μV/°C
	$R_S = 50\Omega$, T_A = +25°C to -55°C			2.7		10		
	$R_S = 50\Omega$, T_A = 0°C to +75°C				5		20	
Input Offset Current	T_A = +125°C Note 3			0.25		3.0		μA
	T_A = -55°C			1.8		7.0		μA
	T_A = 0°C to +75°C						7.5	μA
Average Temperature Coefficient of Input Offset Current	T_A = +25°C to +125°C			5.0		25		nA/°C
	T_A = +25°C to -55°C			15		75		nA/°C
	T_A = +25°C to +75°C				15		50	μA/°C
	T_A = +25°C to 0°C				24		100	μA/°C
Input Bias Current	T_A = -55°C			27		45		μA
	T_A = 0°C				25		40	μA
Input Common Mode Voltage Range	V^- = -7.0V	±5.0	±5.0					V
Common Mode Rejection Ratio	$R_S \leq 200\Omega$	80	70	100	98			dB
Differential Input Voltage Range		±5.0	±5.0					
Voltage Gain		1000	800					
Positive Output Level	$\Delta V_{in} \geq 5mV$, $0 \leq I_{out} \leq 5.0mA$	2.5	2.5	3.2	3.2	4.0	4.0	V
Negative Output Level	$\Delta V_{in} \geq 5mV$	-1.0	-1.0	-0.5	-0.5	0	0	V
Output Sink Current	T_A = +125°C, $\Delta V_{in} \geq 5ma$, $V_{out} = 0$	0.5		1.7				mA
	T_A = -55°C, $\Delta V_{in} \geq 5mV$, $V_{out} = 0$	1.0		2.3				mA
	T_A = 0°C to +75°C, $\Delta V_{in} \geq 5mV$, $V_{out} = 0$		0.5					mA
Positive Supply Current	$V_{out} \leq 0$			5.2	5.2	9.0	9.0	mA
Negative Supply Current				4.6	4.6	7.0	7.0	mA
Power Consumption				90	90	150	150	mW

(Recommended Operating Supply Voltages: V^+ = 12V, V^- = -6V)

NOTES:

1. All voltages are referenced to pin F.
2. The response time specified is measured with a 100mV input step, and a 5mV overdrive.
3. Input Offset Voltage and Input Offset Current are specified for output voltage levels of:

μA710	μA710C
1.8V at -55°C	1.5V at 0°C
1.4V at +25°C	1.4V at +25°C
1.0V at +125°C	1.2V at +75°C

4. Rating applies for temperatures up to: μA710 — +125°C
   μA710C — +75°C