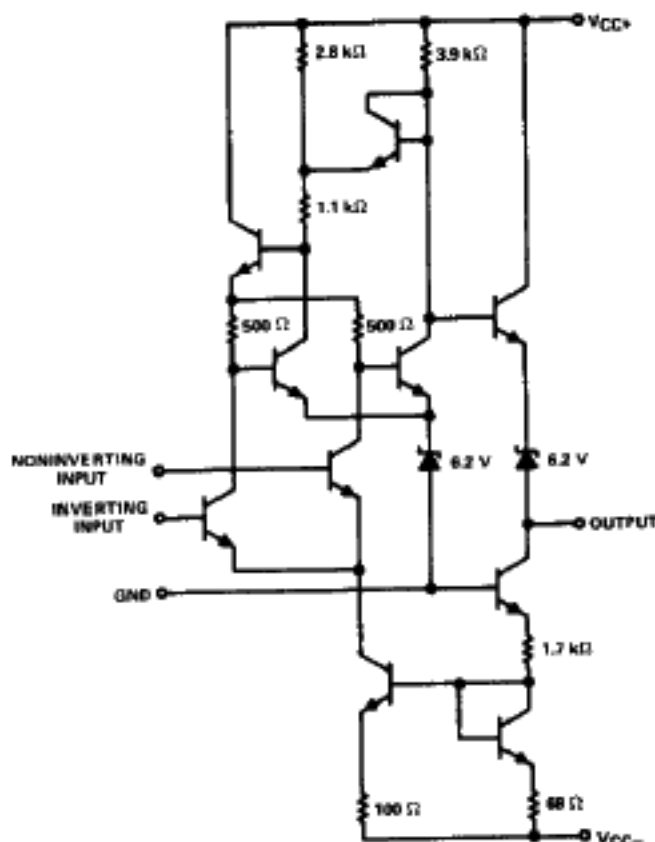


- Fast Response Times
- Low Offset Characteristics
- Output Compatible with Most TTL Circuits
- Designed to be Interchangeable with Fairchild  $\mu$ A710

**description**

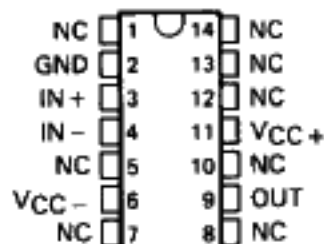
The  $\mu$ A710 is a monolithic high-speed comparator having differential inputs and a low-impedance output. Component matching, inherent in silicon integrated circuit fabrication techniques, produces a comparator with low-drift and low-offset characteristics. This circuit is especially useful for applications requiring an amplitude discriminator, memory sense amplifier, or a high-speed voltage comparator. The  $\mu$ A710M is characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ .

**schematic**

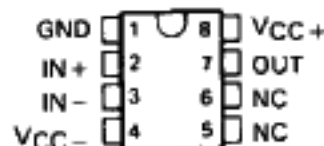


Component values shown are nominal.

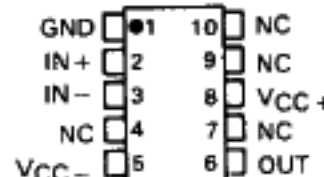
**J DUAL-IN-LINE PACKAGE  
(TOP VIEW)**



**JG DUAL-IN-LINE PACKAGE  
(TOP VIEW)**

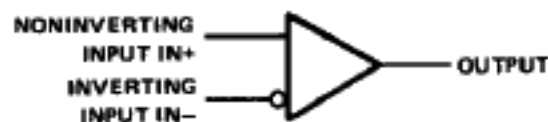


**U FLAT PACKAGE  
(TOP VIEW)**



NC—No internal connection

**symbol**



# TYPE $\mu$ A710M

## DIFFERENTIAL COMPARATOR

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage $V_{CC+}$ (see Note 1)	14 V
Supply voltage $V_{CC-}$ (see Note 1)	-7 V
Differential input voltage (see Note 2)	$\pm 5$ V
Input voltage at either input (see Note 1)	$\pm 7$ V
Peak output current ( $t_W \leq 1$ s)	10 mA
Continuous total power dissipation at (or below) 25°C free-air temperature (see Note 3)	300 mW
Operating free-air temperature range	-55°C to 125°C
Storage temperature range	-65°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds	300°C

- NOTES: 1. All voltage values, except differential voltages, are with respect to the network ground terminal.  
 2. Differential voltages are at the noninverting input terminal with respect to the inverting input terminal.  
 3. For operation above 25°C free-air temperature, refer to the Dissipation Derating Curves in Section 2. In the J and JG packages,  $\mu$ A710M chips are alloy mounted.

electrical characteristics at specified free-air temperature,  $V_{CC+} = 12$  V,  $V_{CC-} = -6$  V (unless otherwise noted)

PARAMETER		TEST CONDITIONS <sup>†</sup>		MIN	TYP	MAX	UNIT	
$V_{IO}$	Input offset voltage	$R_S < 200 \Omega$ ,	See Note 4	25°C	0.6	2	mV	
				Full range		3		
$\alpha V_{IO}$	Average temperature coefficient of input offset voltage	$R_S < 50 \Omega$ ,	See Note 4	Full range	3	10	$\mu V/^\circ C$	
$I_{IO}$	Input offset current	See Note 4		25°C	0.75	3	$\mu A$	
				Full range		7		
$\alpha I_{IO}$	Average temperature coefficient of input offset current	See Note 4		-55°C to 25°C	5	25	nA/°C	
				25°C to 125°C	15	75		
$I_{IB}$	Input bias current	See Note 4		25°C	13	20	$\mu A$	
				Full range		45		
$V_{ICR}$	Common-mode input voltage range	$V_{CC-} = -7$ V		25°C	$\pm 5$		V	
$V_{ID}$	Differential input voltage range			25°C	$\pm 5$		V	
$A_{VD}$	Large-signal differential voltage amplification	No load,	See Note 4	25°C	1250	1700		
				Full range	1000			
$V_{OH}$	High-level output voltage	$V_{ID} = 5$ mV,	$I_{OH} = -5$ mA	25°C	2.5	3.2	4	V
$V_{OL}$	Low-level output voltage	$V_{ID} = -5$ mV,	$I_{OL} = 0$	25°C	-1	-0.5	6 <sup>‡</sup>	V
$I_{OL}$	Low-level output current	$V_{ID} = -5$ mV,	$V_O = 0$	25°C	2	2.5	mA	
				-55°C	1	2.3		
				125°C	0.5	1.7		
$r_o$	Output resistance	$V_O = 1.4$ V		25°C		200	$\Omega$	
CMRR	Common-mode rejection ratio	$R_S < 200 \Omega$		25°C	80	100	dB	
$I_{CC+}$	Supply current from $V_{CC+}$	$V_{ID} = -5$ V to 5 V (-10 mV for typ),		25°C	5.2	9	mA	
$I_{CC-}$	Supply current from $V_{CC-}$			25°C	-4.6	-7	mA	
$P_D$	Total power dissipation	No load		25°C	90	150	mW	

NOTE 4: These characteristics are verified by measurements at the following temperatures and output voltage levels:  $V_O = 1.8$  V at  $T_A = -55^\circ C$ ,  $V_O = 1.4$  V at  $T_A = 25^\circ C$ , and  $V_O = 1$  V at  $T_A = 125^\circ C$ . These output voltage levels were selected to approximate the logic threshold voltages of the types of digital logic circuits these comparators are intended to drive.

<sup>†</sup> Full range for  $\mu$ A710M is -55°C to 125°C.

<sup>‡</sup> The algebraic convention where the more-positive (less-negative) limit is designated as maximum is used in this data sheet for logic levels only, e.g., when 0 V is the maximum, the minimum limit is a more-negative voltage.

4

Voltage Comparators

switching characteristics,  $V_{CC+} = 12\text{ V}$ ,  $V_{CC-} = -6\text{ V}$ ,  $T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	TYP	UNIT
Response time	No load, See Note 5	40	ns

NOTE 5: The response time specified is for a 100-mV input step with 5-mV overdrive and is the interval between the input step function and the instant when the output crosses 1.4 V.

**TYPICAL CHARACTERISTICS**

OUTPUT RESPONSE FOR VARIOUS  
INPUT OVERDRIVES

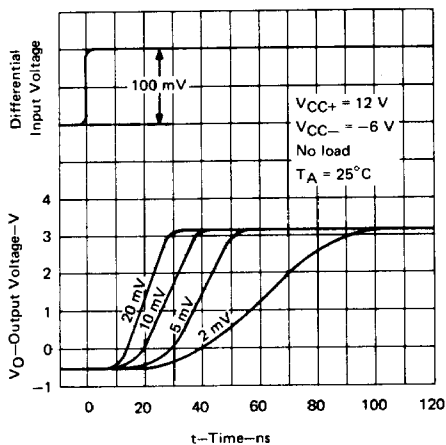


FIGURE 1

OUTPUT RESPONSE FOR VARIOUS  
INPUT OVERDRIVES

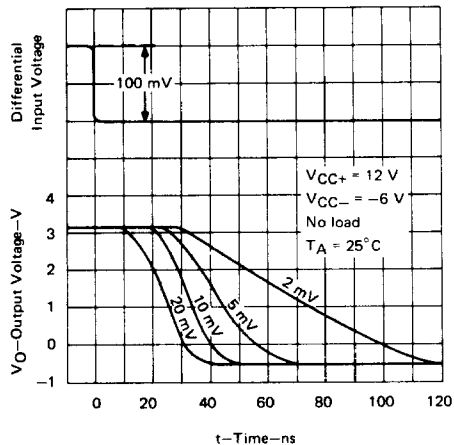


FIGURE 2

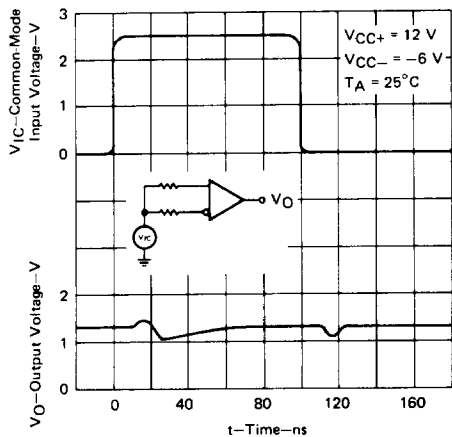
4

Voltage Comparators

**TYPE  $\mu$ A710M**  
**DIFFERENTIAL COMPARATOR**

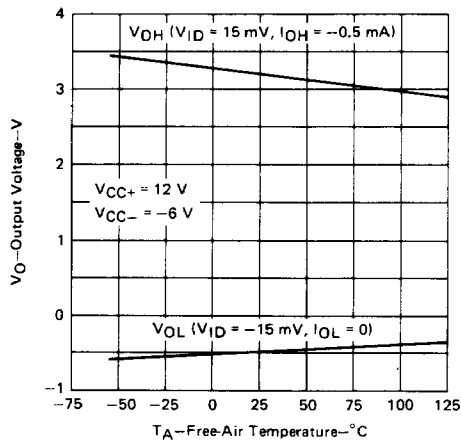
**TYPICAL CHARACTERISTICS**

**COMMON-MODE PULSE RESPONSE**  
vs  
**ELAPSED TIME**



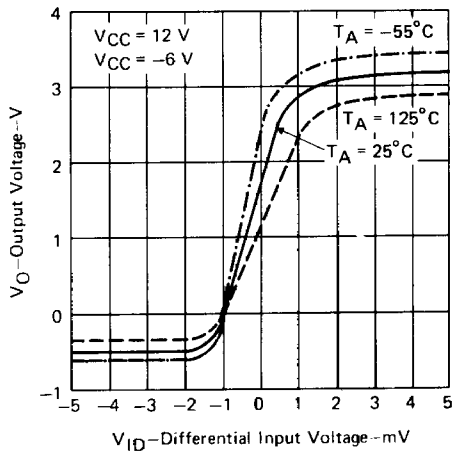
**FIGURE 3**

**OUTPUT VOLTAGE**  
vs  
**FREE-AIR TEMPERATURE**



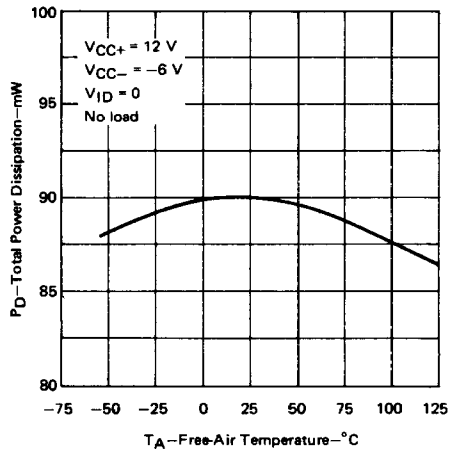
**FIGURE 4**

**VOLTAGE TRANSFER CHARACTERISTICS**



**FIGURE 5**

**TOTAL POWER DISSIPATION**  
vs  
**FREE-AIR TEMPERATURE**



**FIGURE 6**

**4**

**Voltage Comparators**