

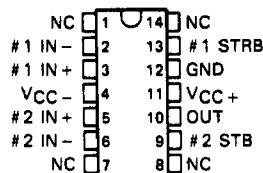
- Fast Response Times
- Low Offset Characteristics
- Output Compatible with Most TTL Circuits
- Designed to be Interchangeable with Fairchild  $\mu$ A711 and  $\mu$ A711C

**description**

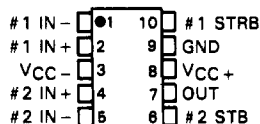
The  $\mu$ A711 is a high-speed dual-channel comparator with differential inputs and a low-impedance output. Component matching, inherent with silicon monolithic circuit fabrication techniques, produces a comparator circuit with low-drift and low-offset characteristics. An independent strobe input is provided for each of the two channels, which when taken low, inhibits the associated channel. If both strobes are simultaneously low, the output will be low regardless of the conditions applied to the differential inputs. The comparator output pulse duration can be "stretched" by varying the capacitive loading. These dual comparators are particularly useful for applications requiring an amplitude-discriminating sense amplifier with an adjustable threshold voltage.

The  $\mu$ A711M is characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ ; the  $\mu$ A711C is characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

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

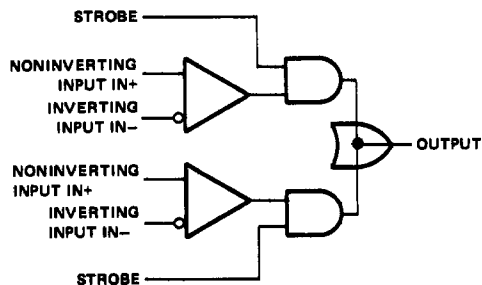


**U FLAT PACKAGE  
(TOP VIEW)**



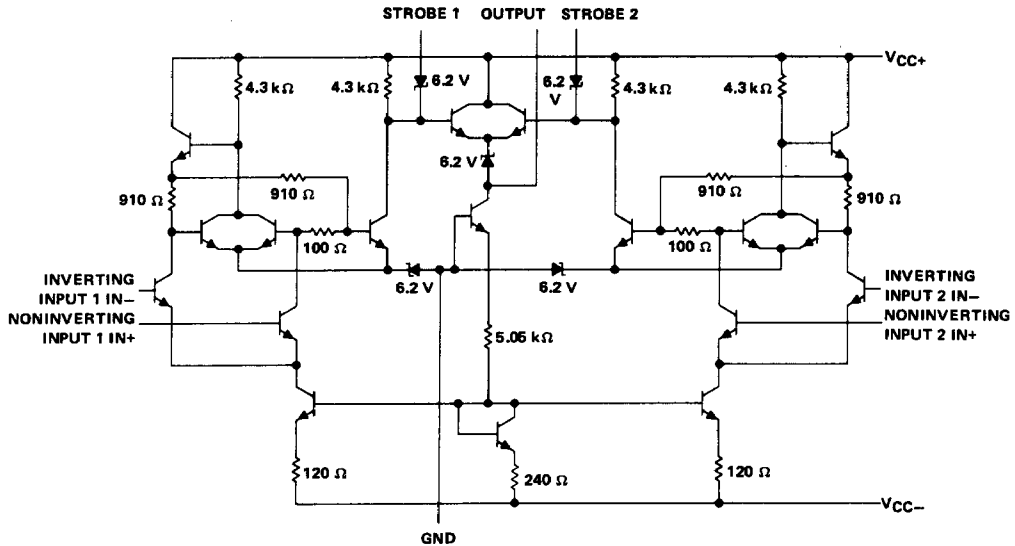
NC—No internal connection

**functional block diagram**



# TYPES $\mu$ A711M, $\mu$ A711C DUAL-CHANNEL DIFFERENTIAL COMPARATORS WITH STROBES

schematic



Component values shown are nominal.

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Voltage Comparators

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

	$\mu$ A711M	$\mu$ A711C	UNIT
Supply voltage $V_{CC+}$ (see Note 1)	14	14	V
Supply voltage $V_{CC-}$ (see Note 1)	-7	-7	V
Differential input voltage (see Note 2)	$\pm 5$	$\pm 5$	V
Input voltage (any input, see Note 1)	$\pm 7$	$\pm 7$	V
Strobe voltage (see Note 1)	6	6	V
Peak output current ( $t_w \leq 1$ s)	50	50	mA
Continuous total power dissipation at (or below) 70°C free-air temperature (see Note 3)	300	300	mW
Operating free-air temperature range	-55 to 125	0 to 70	°C
Storage temperature range	-65 to 150	-65 to 150	°C
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds J or U package	300	300	°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds N package		260	°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 of  $\mu$ A711M above 70°C free-air temperature, refer to Dissipation Derating Curves, Section 2. In the J package,  $\mu$ A711M chips are alloy mounted,  $\mu$ A711C chips are glass mounted.

# TYPES $\mu$ A711M, $\mu$ A711C DUAL-CHANNEL DIFFERENTIAL COMPARATORS WITH STROBES

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

PARAMETER	TEST CONDITIONS <sup>†</sup>	$\mu$ A711M			$\mu$ A711C			UNIT	
		MIN	TYP	MAX	MIN	TYP	MAX		
$V_{IO}$ Input offset voltage	$R_S \leq 200\ \Omega$ , $V_{IC} = 0$ , See Note 4	25°C	1	3.5	1	5	mV		
		Full range	4.5			6			
	$R_S \leq 200\ \Omega$ , See Note 4	25°C	1	5	1	7.5			
		Full range	6			10			
$\alpha_{VIO}$ Average temperature coefficient of input offset voltage	$R_S \leq 200\ \Omega$ , $V_{IC} = 0$ , See Note 4	Full range	5			5	$\mu\text{V}/^\circ\text{C}$		
$I_{IO}$ Input offset current	See Note 4	25°C	0.5	10	0.5	15	$\mu\text{A}$		
		Full range	20			25			
$I_{IB}$ Input bias current	See Note 4	25°C	25	75	25	100	$\mu\text{A}$		
		Full range	150			150			
$I_{IL(S)}$ Low-level strobe current	$V_{(strobe)} = 0$ , $V_{ID} = 10\text{ mV}$	25°C	-1.2	-2.5	-1.2	-2.5	mA		
$V_{ICR}$ Common-mode input voltage range	$V_{CC-} = -7\text{ V}$	25°C	$\pm 5$		$\pm 5$		V		
$V_{ID}$ Differential input voltage range		25°C	$\pm 5$		$\pm 5$		V		
$A_{VD}$ Large-signal differential voltage amplification	No load, $V_O = 0$ to 2.5 V	25°C	750	1500	700	1500			
		Full range	500			500			
$V_{OH}$ High-level output voltage	$V_{ID} = 10\text{ mV}$ , $I_{OH} = 0$ , $V_{ID} = 10\text{ mV}$ , $I_{OH} = -5\text{ mA}$	25°C	4.5	5	4.5	5	V		
		25°C	2.5	3.5	2.5	3.5			
$V_{OL}$ Low-level output voltage	$V_{ID} = -10\text{ mV}$ , $I_{OL} = 0$ , $V_{ID} = 10\text{ mV}$ , $V_{(strobe)} = 0.3\text{ V}$ , $I_{OL} = 0$	25°C	-1	-0.5	0 $\ddagger$	-1	-0.5	0 $\ddagger$	V
		25°C	-1		0 $\ddagger$	-1		0 $\ddagger$	
$I_{OL}$ Low-level output current	$V_{ID} = -10\text{ mV}$ , $V_O = 0$	25°C	0.5	0.8	0.5	0.8	mA		
$r_o$ Output resistance	$V_O = 1.4\text{ V}$	25°C	200			200	$\Omega$		
CMRR Common-mode rejection ratio	$R_S \leq 200\ \Omega$	25°C	70	90	65	90	dB		
$I_{CC+}$ Supply current from $V_{CC+}$	$V_{ID} = -5\text{ V}$ to 5 V (-10 mV for typ), Strobes alternately grounded,	25°C	9			9	mA		
$I_{CC-}$ Supply current from $V_{CC-}$		25°C	-4			-4	mA		
$P_D$ Total power dissipation	No load	25°C	130	200	130	230	mW		

<sup>†</sup> Unless otherwise noted, all characteristics are measured with the strobe of the channel under test open. The strobe of the other channel is grounded. Full range for  $\mu$ A711M is  $-55^\circ\text{C}$  to  $125^\circ\text{C}$  and for the  $\mu$ A711C is  $0^\circ\text{C}$  to  $70^\circ\text{C}$ .

<sup>‡</sup> The algebraic convention, where the most-positive (least-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.

NOTE 4: These characteristics are verified by measurements at the following temperatures and output voltage levels: for  $\mu$ A711M,  $V_O = 1.8\text{ V}$  at  $T_A = -55^\circ\text{C}$ ,  $V_O = 1.4\text{ V}$  at  $T_A = 25^\circ\text{C}$ , and  $V_O = 1\text{ V}$  at  $T_A = 125^\circ\text{C}$ ; for  $\mu$ A711C,  $V_O = 1.5\text{ V}$  at  $T_A = 0^\circ\text{C}$ ,  $V_O = 1.4\text{ V}$  at  $T_A = 25^\circ\text{C}$ , and  $V_O = 1.2\text{ V}$  at  $70^\circ\text{C}$ . 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.

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

PARAMETER	TEST CONDITIONS	$\mu$ A711M			$\mu$ A711C			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	
Response time	No load, See Note 5	40	80		40		ns	
Strobe release time	No load, See Note 6	7	25		7		ns	

NOTES: 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.

6. For testing purposes, the input bias conditions are selected to produce an output voltage of 1.4 V. A 5-mV overdrive is then added to the input bias voltage to produce an output voltage that rises above 1.4 V. The time interval is measured from the 50% point on the strobe voltage waveform to the instant when the overdriven output voltage crosses the 1.4-V level.

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Voltage Comparators

# TYPES $\mu$ A711M, $\mu$ A711C DUAL-CHANNEL DIFFERENTIAL COMPARATORS WITH STROBES

## TYPICAL CHARACTERISTICS

LARGE-SIGNAL DIFFERENTIAL  
VOLTAGE AMPLIFICATION  
VS  
FREE-AIR TEMPERATURE

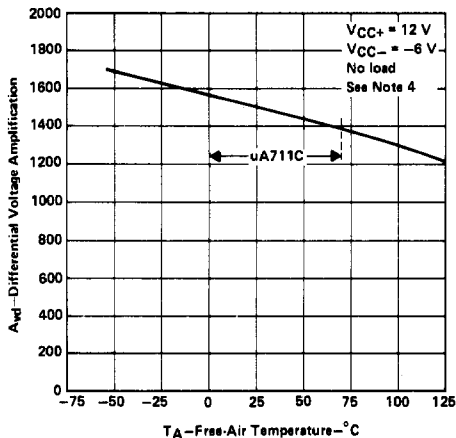


FIGURE 1

LARGE-SIGNAL DIFFERENTIAL  
VOLTAGE AMPLIFICATION  
VS  
SUPPLY VOLTAGE

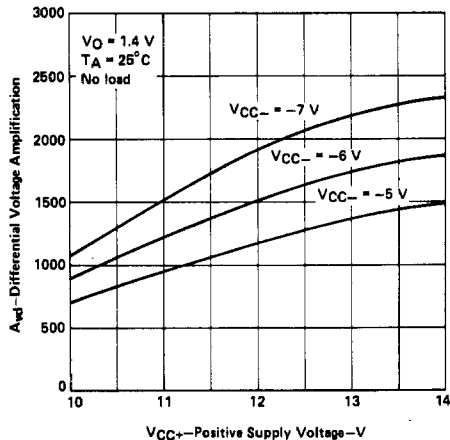


FIGURE 2

INPUT BIAS CURRENT  
VS  
FREE-AIR TEMPERATURE

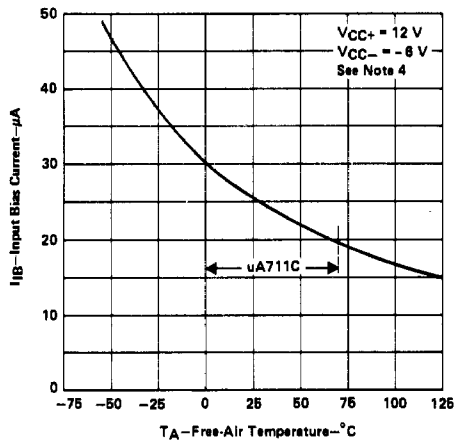


FIGURE 3

TOTAL POWER DISSIPATION  
VS  
FREE-AIR TEMPERATURE

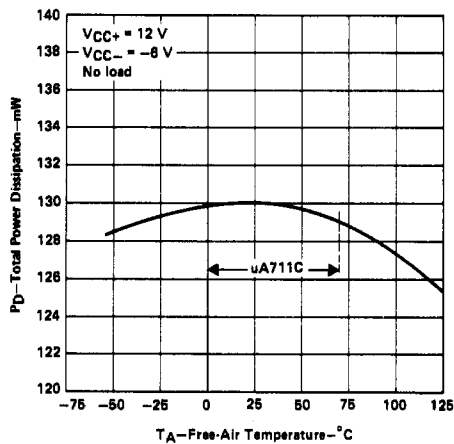


FIGURE 4

NOTE 4: These characteristics are verified by measurements at the following temperatures and output voltage levels: for  $\mu$ A711M,  $V_O = 1.8\text{ V}$  at  $T_A = -55^\circ\text{C}$ ,  $V_O = 1.4\text{ V}$  at  $T_A = 25^\circ\text{C}$ , and  $V_O = 1\text{ V}$  at  $T_A = 125^\circ\text{C}$ ; for  $\mu$ A711C,  $V_O = 1.5\text{ V}$  at  $T_A = 0^\circ\text{C}$ ,  $V_O = 1.4\text{ V}$  at  $T_A = 25^\circ\text{C}$ , and  $V_O = 1.2\text{ V}$  at  $70^\circ\text{C}$ . 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.

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Voltage Comparators

TYPES  $\mu$ A711M,  $\mu$ A711C  
 DUAL-CHANNEL DIFFERENTIAL COMPARATORS WITH STROBES

TYPICAL CHARACTERISTICS

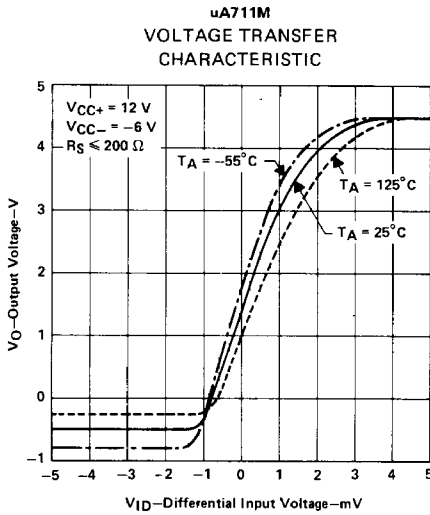


FIGURE 5

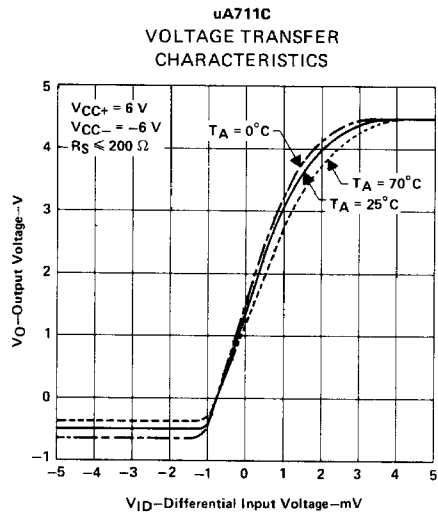


FIGURE 6

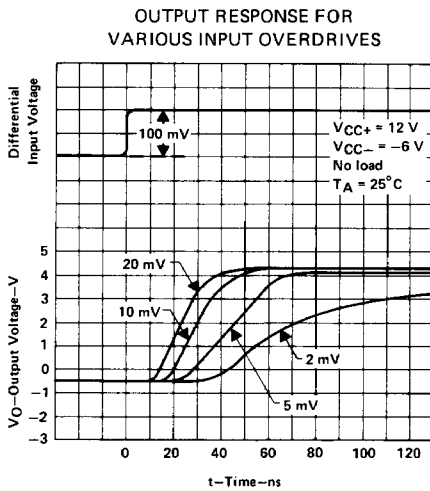


FIGURE 7

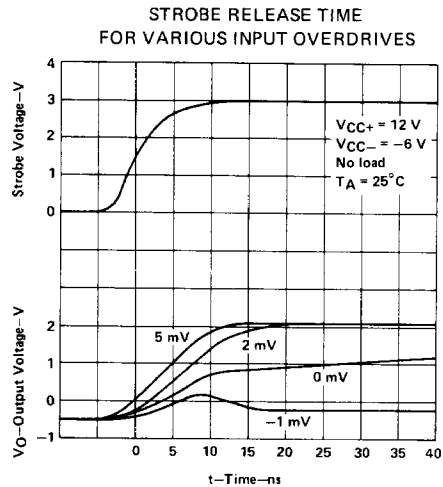


FIGURE 8

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Voltage Comparators