FAIRCHILD
A Schlumberger Company

μA711
Dual High Speed Differential Comparator

Linear Division Comparators

Description

The μA711 is a dual high speed differential comparator featuring high accuracy, fast response times, large input voltage range, low power consumption and compatibility with practically all integrated logic forms. When used as a sense amplifier, the threshold voltage can be adjusted over a wide range, almost independent of the integrated circuit characteristics. Independent strobing of each comparator channel is provided, and pulse stretching on the output is easily accomplished. Other applications of the dual comparator include a window discriminator in pulse height detectors and a double ended limit detector for automatic Go/No-Go test equipment. The μA711, which is similar to the μA710 differential comparator, is constructed using the Fairchild Planar Epitaxial process.

- **Fast Response Time — 40 ns Typical**
- **5.0 mV Maximum Offset Voltage**
- **10 μA Maximum Offset Current**
- **Independent Comparator Strobing**

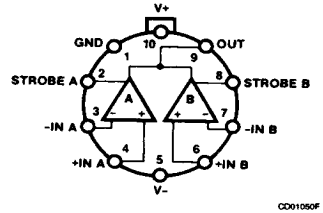
Absolute Maximum Ratings

Storage Temperature Range	
Metal Can and Ceramic DIP	−65°C to +175°C
Molded DIP	−65°C to +150°C
Operating Temperature Range	
Extended (μA711M)	−55°C to +125°C
Commercial (μA711C)	0°C to 70°C
Lead Temperature	
Metal Can and Ceramic DIP (soldering, 60 s)	300°C
Molded DIP (soldering, 10 s)	265°C
Internal Power Dissipation[1, 2]	
10L-Metal Can	1.07 W
14L-Ceramic DIP	1.36 W
14L-Molded DIP	1.04 W
Positive Supply Voltage	+14 V
Negative Supply Voltage	−7.0 V
Peak Output Current	50 mA
Differential Input Voltage	±5.0 V
Input Voltage	±7.0 V
Strobe Voltage	0 V to +6.0 V

Notes

1. $T_{J\ Max}$ = 150°C for the Molded DIP, and 175°C for the Metal Can and Ceramic DIP.
2. Ratings apply to ambient temperature at 25°C. Above this temperature, derate the 10L-Metal Can at 7.1 mW°C, the 14L-Ceramic DIP at 9.1 mW°C, and the 14L-Molded DIP at 8.3 mW°C.

Connection Diagram 10-Lead Metal Package (Top View)



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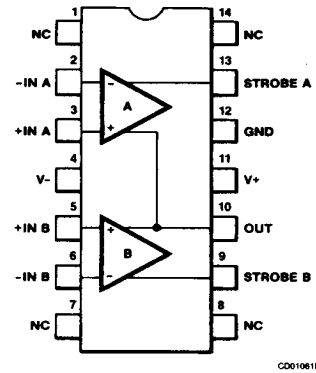
Lead 5 connected to case

Order Information

Device Code	Package Code	Package Description
μA711HM	5X	Metal
μA711HC	5X	Metal

Connection Diagram 14-Lead DIP (Top View)



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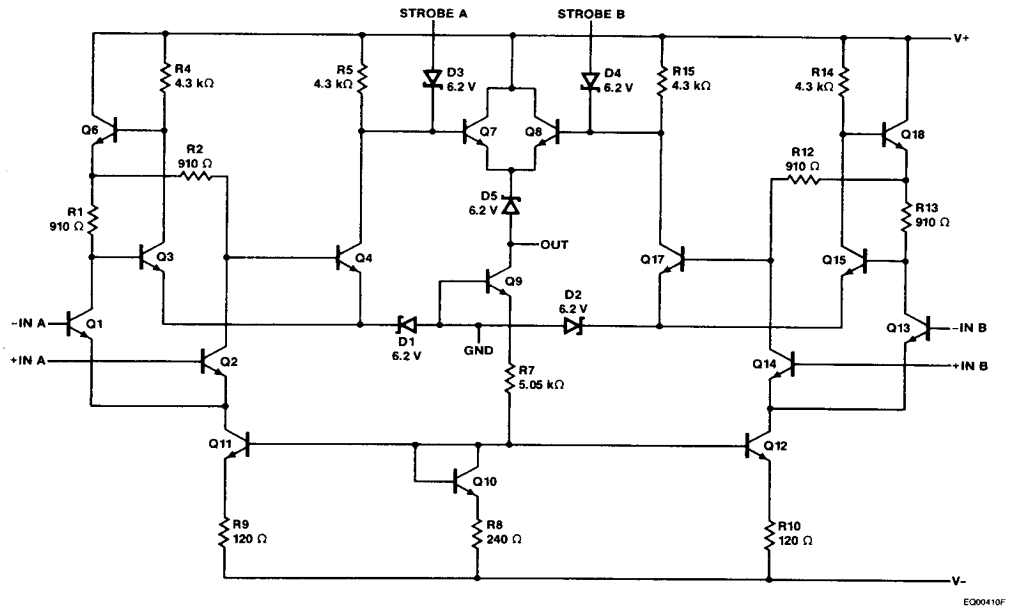
Order Information

Device Code	Package Code	Package Description
μA711DM	6A	Ceramic DIP
μA711DC	6A	Ceramic DIP
μA711PC	9A	Molded DIP

Equivalent Circuit



μA711

Electrical Characteristics $T_A = 25°C$, $V+ = 12$ V, $V- = -6.0$ V, unless otherwise specified.

Symbol	Characteristic	Condition	Min	Typ	Max	Unit
V_{IO}	Input Offset Voltage	$V_O = 1.4$ V, $R_S \leq 200\ \Omega$, $V_{CM} = 0$ V		1.0	3.5	mV
		$V_O = 1.4$ V, $R_S \leq 200\ \Omega$		1.0	5.0	
I_{IO}	Input Offset Current	$V_O = 1.4$ V		0.5	10.0	μA
I_{IB}	Input Bias Current			25	75	μA
A_{VS}	Large Signal Voltage Gain		750	1500		V/V
t_{PD}	Response Time[1]			40		ns
t_{STRL}	Strobe Release Time			12		ns
V_{IR}	Input Voltage Range	$V- = -7.0$ V	±5.0			V
V_{IDR}	Differential Input Voltage Range		±5.0			V
R_O	Output Resistance			200		Ω
V_{OH}	Output Voltage HIGH	$V_I \geq 10$ mV		4.5	5.0	V
V_{OH}	Loaded Output Voltage HIGH	$V_I \geq 10$ mV, $I_{OH} = 5.0$ mA	2.5	3.5		V
V_{OL}	Output Voltage LOW	$V_I \geq 10$ mV	−1.0	−0.5	0	V
$V_{O(ST)}$	Strobed Output Level	$V_{ST} \leq 0.3$ V	−1.0		0	V

μA711 (Cont.)
Electrical Characteristics $T_A = 25°C$, V+ = 12 V, V– = –6.0 V, unless otherwise specified.

Symbol	Characteristic	Condition	Min	Typ	Max	Unit
I_{OL}	Output Sink Current	$V_I \geq 10$ mV, $V_O \geq 0$ V	0.5	0.8		mA
$I_{O(ST)}$	Strobe Current	$V_{ST} = 100$ mV		1.2	2.5	mA
I+	Positive Supply Current	V_O = GND, Inverting Input = 5.0 mV		8.6		mA
I–	Negative Supply Current	V_O = GND, Inverting Input = 5.0 mV		3.9		mA
P_c	Power Consumption			130	200	mW
The following specifications apply for $-55°C \leq T_A \leq +125°C$						
V_{IO}	Input Offset Voltage[2]	$R_S \leq 200\ \Omega$, $V_{CM} = 0$ V			4.5	mV
		$R_S \leq 200\ \Omega$			6.0	mV
I_{IO}	Input Offset Current				20	μA
I_{IB}	Input Bias Current				150	μA
$\Delta V_{IO}/\Delta T$	Temperature Coefficient of Input Offset Voltage			5.0		μV/°C
A_{VS}	Large Signal Voltage Gain		500			V/V

μA711C
Electrical Characteristics $T_A = 25°C$, V+ = 12 V, V– = –6.0 V, unless otherwise specified.

Symbol	Characteristic	Condition[1]	Min	Typ	Max	Unit
V_{IO}	Input Offset Voltage	$V_O = +1.4$ V, $R_S \leq 200\ \Omega$, $V_{CM} = 0$ V		1.0	5.0	mV
		$V_O = +1.4$ V, $R_S \leq 200\ \Omega$		1.0	7.5	mV
I_{IO}	Input Offset Current	$V_O = +1.4$ V		0.5	15	μA
I_{IB}	Input Bias Current			25	100	μA
A_{VS}	Large Signal Voltage Gain		700	1500		V/V
t_{PD}	Response Time[1]			40		ns
t_{STRL}	Strobe Release Time			12		ns
V_{IR}	Input Voltage Range	V– = –7.0 V	±5.0			V
V_{IDR}	Differential Input Voltage Range		±5.0			V
R_O	Output Resistance			200		Ω
V_{OH}	Output Voltage HIGH	$V_I \geq 10$ mV		4.5	5.0	V
V_{OH}	Loaded Output Voltage HIGH	$V_I \geq 10$ mV, $I_{OH} = 5.0$ mA	2.5	3.5		V
V_{OL}	Output Voltage LOW	$V_I \geq 10$ mV	–1.0	–0.5	0	V
$V_{O(ST)}$	Strobed Output Level	$V_{ST} \leq 0.3$ V	–1.0		0	V
I_{OL}	Output Sink Current	$V_I \geq 10$ mV, $V_O \geq$ GND	0.5	0.8		mA
$I_{O(ST)}$	Strobe Current	$V_{ST} = 100$ mV		1.2	2.5	mA
I+	Positive Supply Current	V_O = GND, Inverting Input = 10 mV		8.6		mA

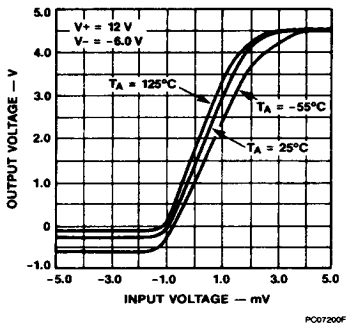
μA711C (Cont.)
Electrical Characteristics $T_A = 25°C$, V+ = 12 V, V– = –6.0 V, unless otherwise specified.

Symbol	Characteristic	Condition[1]	Min	Typ	Max	Unit
I_-	Negative Supply Current	V_O = GND, Inverting Input = 10 mV		3.9		mA
P_c	Power Consumption			130	230	mW
The following specifications apply for $0°C \leq T_A \leq 70°C$						
V_{IO}	Input Offset Voltage[2]	$R_S \leq 200\ \Omega$, $V_{CM} = 0$ V			6.0	mV
		$R_S \leq 200\ \Omega$			10	mV
I_{IO}	Input Offset Current				25	μA
I_{IB}	Input Bias Current				150	μA
$\Delta V_{IO}/\Delta T$	Temperature Coefficient of Input Offset Voltage			5.0		μV/°C
A_{VS}	Large Signal Voltage Gain		500			V/V

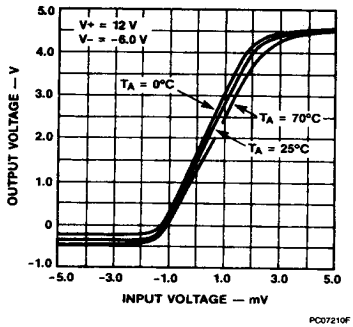
Notes
1. The response time specified is for a 100 mV step input with 5.0 mV overdrive.
2. The input offset voltage is specified for a logic threshold as follows:
   μA711: 1.8 V at –55°C, 1.4 V at +25°C, 1.0 V at +125°C
   μA711C: 1.5 V at 0°C, 1.4 V at 25°C, 1.2 V at 70°C

Typical Performance Curves

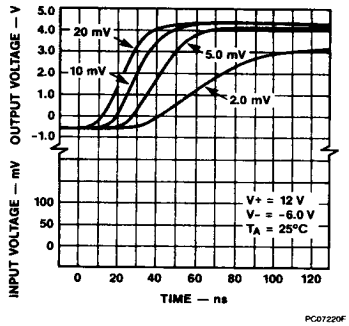
Voltage Transfer Characteristic μA711



Voltage Transfer Characteristic μA711C

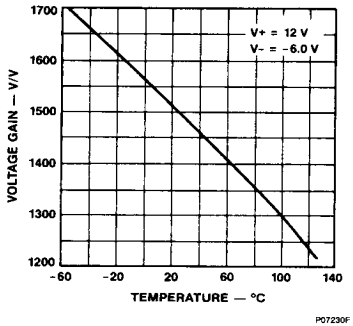


Response Time for Various Input Overdrives



Typical Performance Curves (Cont.)

Voltage Gain vs Temperature



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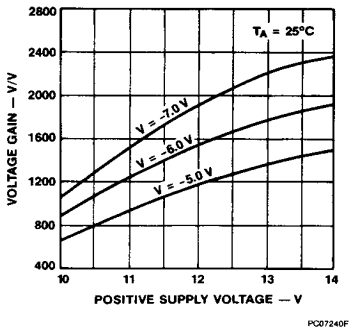
Voltage Gain vs Supply Voltages



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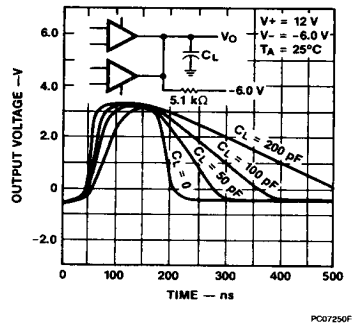
Output Pulse Stretching With Capacitive Loading



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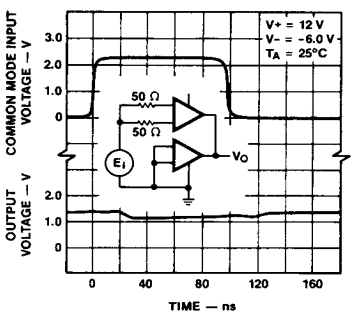
Common Mode Pulse Response



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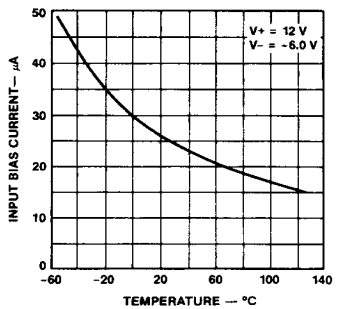
Input Bias Current vs Temperature



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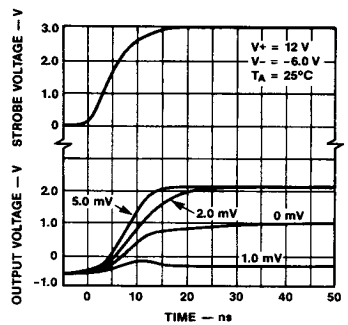
Strobe Release Time for Various Input Overdrives



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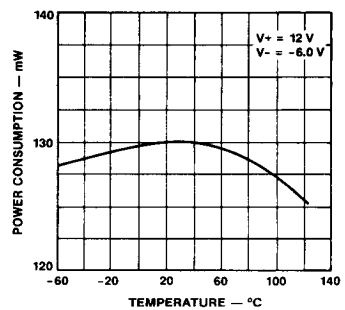
Power Consumption vs Temperature



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