

MC1710 MC1710C



MOTOROLA

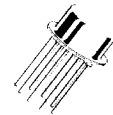
DIFFERENTIAL VOLTAGE COMPARATORS

...designed for use in level detection, low-level sensing, and memory applications.

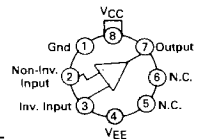
- Differential Input Characteristics –
Input Offset Voltage = 1.0 mV – MC1710
= 1.5 mV – MC1710C
Offset Voltage Drift = 3.0 $\mu\text{V}/^\circ\text{C}$ – MC1710
= 5.0 $\mu\text{V}/^\circ\text{C}$ – MC1710C
- Fast Response Time – 40 ns
- Output Compatible with all Saturating Logic Forms –
 $V_O = +3.2\text{ V}$ to -0.5 V (Typ)
- Low Output Impedance – 200 Ohms

DIFFERENTIAL COMPARATORS

**SILICON MONOLITHIC
INTEGRATED CIRCUIT**

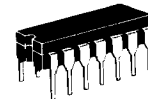


**G SUFFIX
METAL PACKAGE
CASE 601-04**

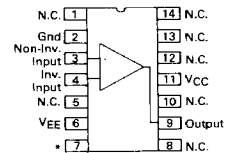


MAXIMUM RATINGS ($T_A = +25^\circ\text{C}$ unless otherwise noted.)

Rating	Symbol	Value	Unit
Power Supply Voltage	$V_{CC}(\text{max})$ $V_{EE}(\text{max})$	+14 -7.0	Vdc Vdc
Differential Input Signal Voltage	V_{ID}	± 5.0	Volts
Common Mode Input Swing Voltage	V_{ICR}	± 7.0	Volts
Peak Load Current	I_L	10	mA
Power Dissipation (Package Limitations)	P_D		
Metal Package		680	mW
Derate above $T_A = +25^\circ\text{C}$		4.6	mW/ $^\circ\text{C}$
Ceramic Dual In-Line Package		625	mW
Derate above $T_A = +25^\circ\text{C}$		5.0	mW/ $^\circ\text{C}$
Operating Temperature Range	T_A	-55 to +125 0 to +75	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-65 to +150	$^\circ\text{C}$

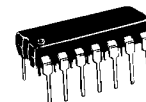
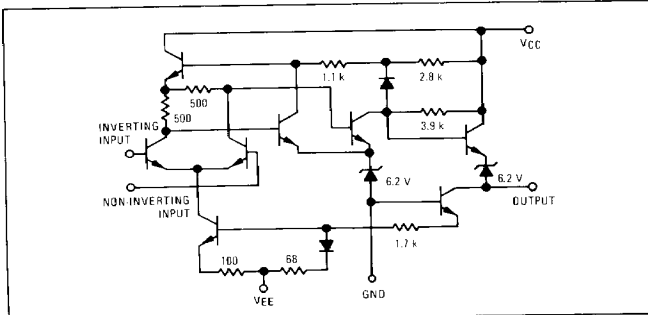


**L SUFFIX
CERAMIC PACKAGE
CASE 632-02
MO-001AA**



*Connected to pin 6 via the substrate on some plastic units.

EQUIVALENT CIRCUIT



**P SUFFIX
PLASTIC PACKAGE
CASE 646-05
(MC1710C Only)**

MOTOROLA LINEAR/INTERFACE DEVICES

ELECTRICAL CHARACTERISTICS ($V_{CC} = +12\text{ Vdc}$, $V_{EE} = -6.0\text{ Vdc}$, $T_A = +25^\circ\text{C}$ unless otherwise noted.)

Characteristic		Symbol	Min	Typ	Max	Unit
Input Offset Voltage ($V_O = 1.4\text{ Vdc}$, $T_A = +25^\circ\text{C}$)	MC1710	V_{IO}	—	1.0	2.0	mVdc
	MC1710C		—	1.0	5.0	
	($V_O = 1.8\text{ Vdc}$, $T_A = -55^\circ\text{C}$)		—	—	3.0	
	($V_O = 1.0\text{ Vdc}$, $T_A = +125^\circ\text{C}$)		—	—	3.0	
	($V_O = 1.5\text{ Vdc}$, $T_A = 0^\circ\text{C}$)		—	—	6.5	
	($V_O = 1.2\text{ Vdc}$, $T_A = +75^\circ\text{C}$)		—	—	6.5	
Temperature Coefficient of Input Offset Voltage		$\Delta V_{IO}/\Delta T$	—	3.0	—	$\mu\text{V}/^\circ\text{C}$
Input Offset Current ($V_O = 1.4\text{ Vdc}$, $T_A = +25^\circ\text{C}$)	MC1710	I_{IO}	—	1.0	3.0	μAdc
	MC1710C		—	1.0	5.0	
	($V_O = 1.8\text{ Vdc}$, $T_A = -55^\circ\text{C}$)		—	—	7.0	
	($V_O = 1.0\text{ Vdc}$, $T_A = +125^\circ\text{C}$)		—	—	3.0	
	($V_O = 1.5\text{ Vdc}$, $T_A = 0^\circ\text{C}$)		—	—	7.5	
	($V_O = 1.2\text{ Vdc}$, $T_A = +75^\circ\text{C}$)		—	—	7.5	
Input Bias Current ($V_O = 1.4\text{ Vdc}$, $T_A = +25^\circ\text{C}$)	MC1710	I_{IB}	—	12	20	μAdc
	MC1710C		—	12	25	
	($V_O = 1.8\text{ Vdc}$, $T_A = -55^\circ\text{C}$)		—	—	45	
	($V_O = 1.0\text{ Vdc}$, $T_A = +125^\circ\text{C}$)		—	—	20	
	($V_O = 1.5\text{ Vdc}$, $T_A = 0^\circ\text{C}$)		—	—	40	
	($V_O = 1.2\text{ Vdc}$, $T_A = +75^\circ\text{C}$)		—	—	40	
Voltage Gain ($T_A = +25^\circ\text{C}$)	MC1710	A_{vol}	1250	1700	—	V/V
	MC1710C		1000	1700	—	
	($T_A = T_{low}$ to T_{high}) (1)		1000	—	—	
	MC1710C		800	—	—	
Output Resistance		r_o	—	200	—	Ohms
Differential Voltage Range		V_{ID}	± 5.0	—	—	Vdc
Positive Output Voltage ($V_{ID} \geq 5.0\text{ mV}$, $0 \leq I_O \leq 5.0\text{ mA}$)		V_{OH}	2.5	3.2	4.0	Vdc
Negative Output Voltage ($V_{ID} \geq -5.0\text{ mV}$)		V_{OL}	-1.0	-0.5	0	Vdc
Output Sink Current ($V_{ID} \geq -5.0\text{ mV}$, $V_O \leq 0$)	MC1710	I_{Os}	2.0	2.5	—	mAdc
	MC1710C		1.6	2.5	—	
	($V_{ID} \geq -5.0\text{ mV}$, $V_O \geq 0$, $T_A = T_{low}$)		1.0	2.0	—	
	MC1710C		0.5	—	—	
Input Common-Mode Voltage Range ($V_{EE} = -7.0\text{ Vdc}$)		V_{ICR}	± 5.0	—	—	Volts
Common-Mode Rejection Ratio ($V_{EE} = -7.0\text{ Vdc}$, $R_S \leq 200\text{ Ohms}$)	MC1710	CMRR	80	100	—	dB
	MC1710C		70	100	—	
Propagation Delay Time for Positive and Negative Going Input Pulse ($V_{ID} = 5.0\text{ mV} + V_{IO}$)		t_{PLH}	—	40	—	ns
		t_{PHL}	—	35	—	
Power Supply Current ($V_O \leq 0$)		I_{D+}	—	6.4	9.0	mAdc
		I_{D-}	—	5.5	7.0	
Power Consumption		P_D	—	115	150	mW

(1) $T_{low} = -55^\circ\text{C}$ for MC1710, 0°C for MC1710C
 $T_{high} = +125^\circ\text{C}$ for MC1710, $+75^\circ\text{C}$ for MC1710C

TYPICAL CHARACTERISTICS

FIGURE 1 – VOLTAGE TRANSFER CHARACTERISTICS

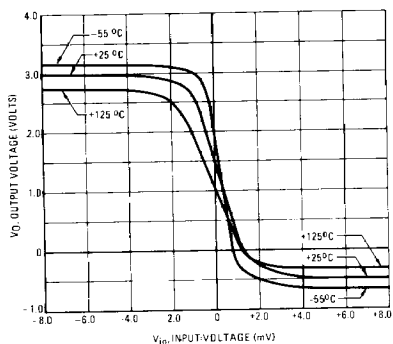


FIGURE 3 – INPUT OFFSET CURRENT versus TEMPERATURE

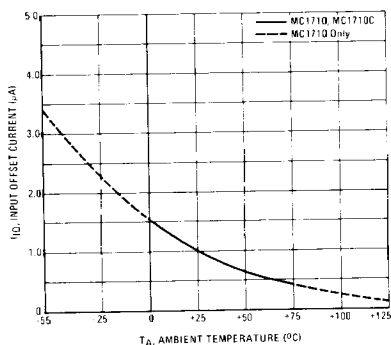


FIGURE 5 – GAIN VARIATION WITH POWER SUPPLY VOLTAGE

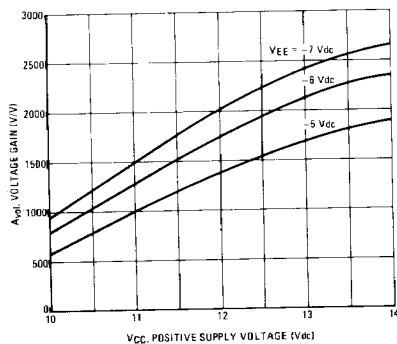


FIGURE 2 – INPUT OFFSET VOLTAGE versus TEMPERATURE

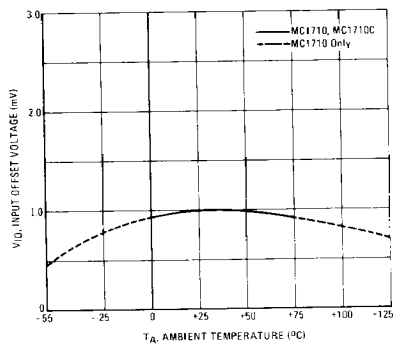


FIGURE 4 – INPUT BIAS CURRENT versus TEMPERATURE

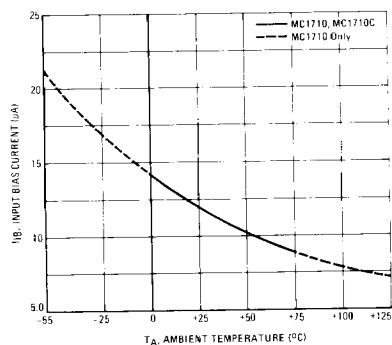
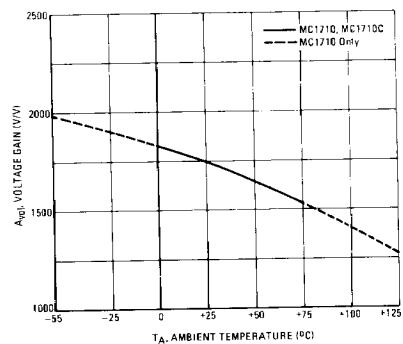


FIGURE 6 – VOLTAGE GAIN versus TEMPERATURE



TYPICAL CHARACTERISTICS (Continued)

FIGURE 7 – RESPONSE TIME

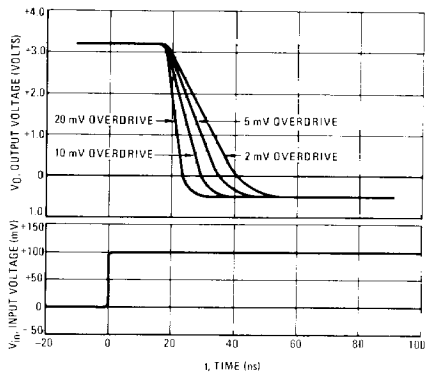


FIGURE 8 – POWER DISSIPATION versus TEMPERATURE

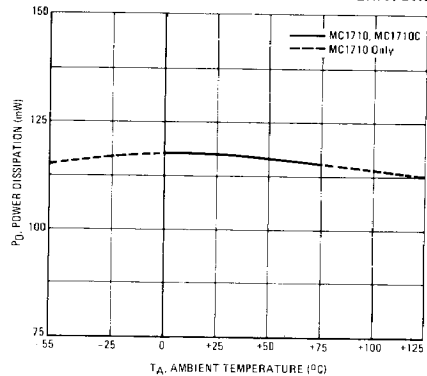


FIGURE 9 – RECOMMENDED SERIES RESISTANCE versus MRTL LOADS

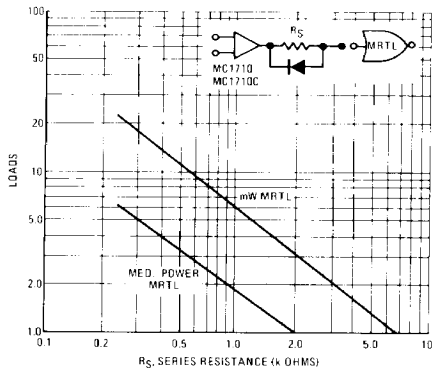


FIGURE 10 – FAN-OUT CAPABILITY WITH MDTL OR MTTL OUTPUT SWING

