MC1710
MC1710C

MOTOROLA

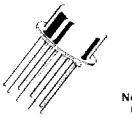
DIFFERENTIAL VOLTAGE COMPARATORS

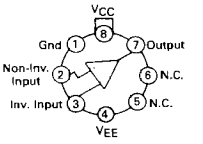
. . . designed for use in level detection, low-level sensing, and memory applications.

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

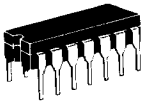
DIFFERENTIAL COMPARATORS

SILICON MONOLITHIC INTEGRATED CIRCUIT

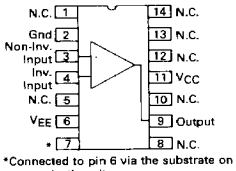




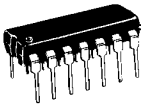
G SUFFIX
METAL PACKAGE
CASE 601-04



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



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

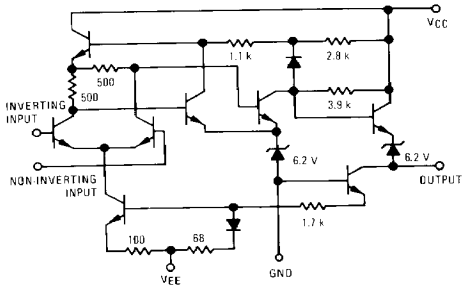


P SUFFIX
PLASTIC PACKAGE
CASE 646-05
(MC1710C Only)

MAXIMUM RATINGS (T_A = +25^{o}C unless otherwise noted.)

Rating	Symbol	Value	Unit
Power Supply Voltage	$V_{CC(max)}$ $V_{EE(max)}$	+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 Derate above T_A = +25^{o}C		680 4.6	mW mW/^{o}C
Ceramic Dual In-Line Package Derate above T_A = +25^{o}C		625 5.0	mW mW/^{o}C
Operating Temperature Range MC1710 MC1710C	T_A	-55 to +125 0 to +75	^{o}C
Storage Temperature Range	T_{stg}	-65 to +150	^{o}C

EQUIVALENT CIRCUIT



ELECTRICAL CHARACTERISTICS (V_{CC} = +12 Vdc, V_{EE} = -6.0 Vdc, T_A = +25°C unless otherwise noted.)

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

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

TYPICAL CHARACTERISTICS

FIGURE 1 – VOLTAGE TRANSFER CHARACTERISTICS

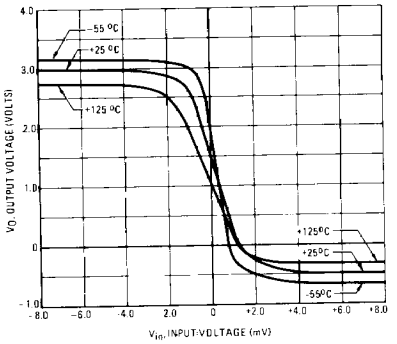


FIGURE 2 – INPUT OFFSET VOLTAGE versus TEMPERATURE

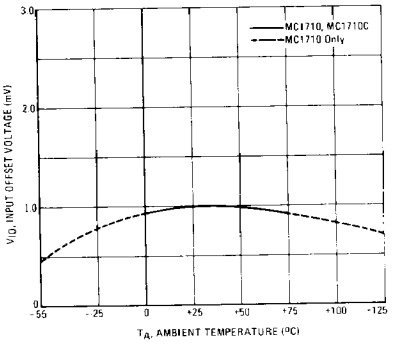


FIGURE 3 – INPUT OFFSET CURRENT versus TEMPERATURE

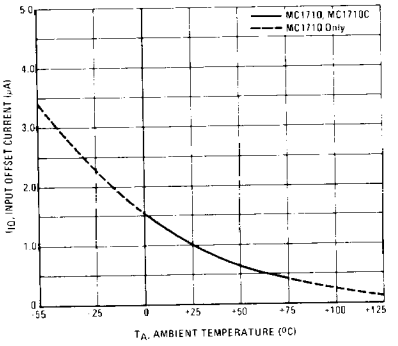


FIGURE 4 – INPUT BIAS CURRENT versus TEMPERATURE

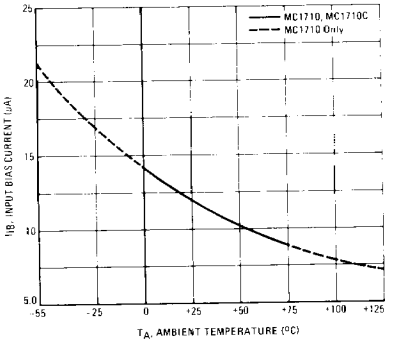


FIGURE 5 – GAIN VARIATION WITH POWER SUPPLY VOLTAGE

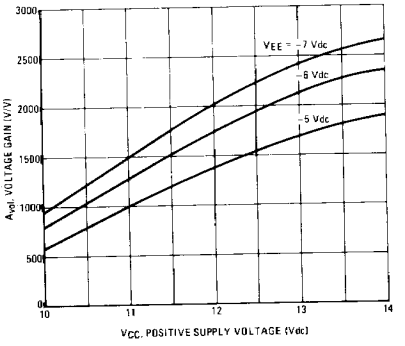
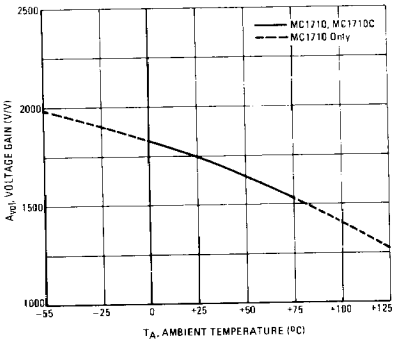


FIGURE 6 – VOLTAGE GAIN versus TEMPERATURE



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TYPICAL CHARACTERISTICS (Continued)

FIGURE 7 – RESPONSE TIME

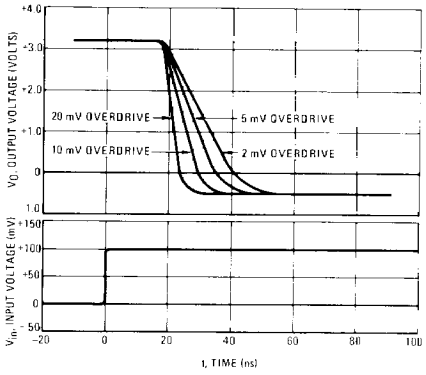


FIGURE 8 – POWER DISSIPATION versus TEMPERATURE

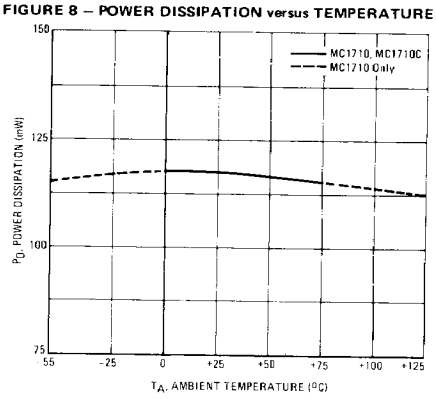


FIGURE 9 – RECOMMENDED SERIES RESISTANCE versus MRTL LOADS

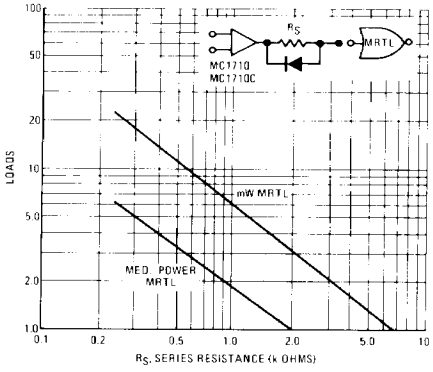
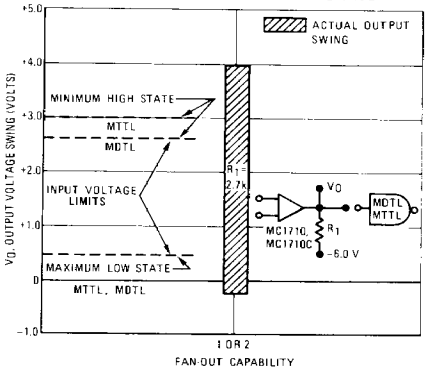


FIGURE 10 – FAN-OUT CAPABILITY WITH MDTL OR MTTL OUTPUT SWING



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