

MC1710

DIFFERENTIAL COMPARATOR

MONOLITHIC DIFFERENTIAL VOLTAGE COMPARATOR

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

- Differential Input Characteristics –
Input Offset Voltage = 1.0 mV
Offset Voltage Drift = 3.0 $\mu\text{V}/^\circ\text{C}$
- Fast Response Time – 40 ns
- Output Compatible With All Saturating Logic Forms –
 $V_{\text{out}} = +3.2 \text{ V to } -0.5 \text{ V}$ typical
- Low Output Impedance – 200 ohms

DIFFERENTIAL COMPARATOR INTEGRATED CIRCUIT

MONOLITHIC SILICON EPITAXIAL PASSIVATED

Lead 4 connected to case



G SUFFIX
METAL PACKAGE
CASE 601
TO-99



F SUFFIX
CERAMIC PACKAGE
CASE 606
TO-91

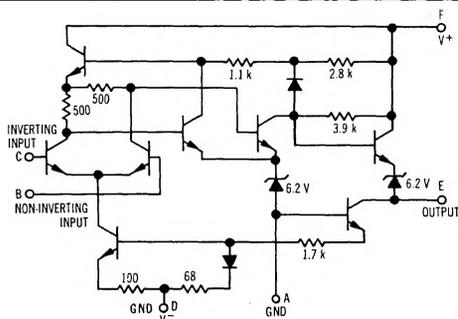
MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit	
Power Supply Voltage	V^+	+14	Vdc	
	V^-	-7.0	Vdc	
Differential Input Signal	V_{in}	± 5.0	Volts	
Common Mode Input Swing	CMV_{in}	± 7.0	Volts	
Peak Load Current	I_L	10	mA	
Power Dissipation (package limitations)	P_D	Metal Can	680	mW
		Derate above $T_A = +25^\circ\text{C}$	4.6	mW/ $^\circ\text{C}$
		Flat Package	500	mW
		Derate above $T_A = +25^\circ\text{C}$	3.3	mW/ $^\circ\text{C}$
Operating Temperature Range	T_A	-55 to +125	$^\circ\text{C}$	
Storage Temperature Range	T_{stg}	-65 to +150	$^\circ\text{C}$	

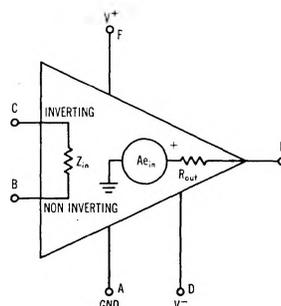
PIN CONNECTIONS

Schematic	A	B	C	D	E	F
"G" Package	1	2	3	4	7	8
"F" Package	1	2	3	5	6	8

CIRCUIT SCHEMATIC



EQUIVALENT CIRCUIT



See Packaging Information Section for outline dimensions.

See current MCC1710/1710C data sheet for standard linear chip information.

MC1710 (continued)

ELECTRICAL CHARACTERISTICS ($V^+ = +12$ Vdc, $V^- = -6$ Vdc, $T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristic Definitions (linear operation)	Characteristic	Symbol	Min	Typ	Max	Unit
	Input Offset Voltage $V_{out} = 1.4$ Vdc, $T_A = 25^\circ\text{C}$ $V_{out} = 1.8$ Vdc, $T_A = -55^\circ\text{C}$ $V_{out} = 1.0$ Vdc, $T_A = +125^\circ\text{C}$	V_{io}	-	1.0	2.0 3.0 3.0	mVdc
	Temperature Coefficient of Input Offset Voltage	$TC_{V_{io}}$	-	3.0	-	$\mu\text{V}/^\circ\text{C}$
	Input Offset Current $V_{out} = 1.4$ Vdc, $T_A = 25^\circ\text{C}$ $V_{out} = 1.8$ Vdc, $T_A = -55^\circ\text{C}$ $V_{out} = 1.0$ Vdc, $T_A = +125^\circ\text{C}$	I_{io}	-	1.0	3.0 7.0 3.0	μA dc
	Input Bias Current $V_{out} = 1.4$ Vdc, $T_A = 25^\circ\text{C}$ $V_{out} = 1.8$ Vdc, $T_A = -55^\circ\text{C}$ $V_{out} = 1.0$ Vdc, $T_A = +125^\circ\text{C}$	I_b	-	12	20 45 20	μA dc
	Open Loop Voltage Gain $T_A = 25^\circ\text{C}$ $T_A = -55$ to $+125^\circ\text{C}$	A_{VOL}	1250 1000	1700	-	V/V
	Output Resistance	R_{out}	-	200	-	ohms
	Differential Voltage Range $V_{in} \geq 5.0$ mV, $0 \leq I_D \leq 5.0$ mA Positive Output Voltage $V_{in} \geq 5.0$ mV, $V_{out} \geq 0$ Negative Output Voltage $V_{in} \geq -5.0$ mV, $V_{out} \leq 0$ Output Sink Current $V_{in} \geq -5.0$ mV, $V_{out} \geq 0$, $T_A = 25^\circ\text{C}$ $V_{in} \geq -5.0$ mV, $V_{out} \geq 0$, $T_A = -55^\circ\text{C}$	V_{in} V_{OH} V_{OL} I_s	± 5.0	-	2.5 -1.0 0 2.0 - - 1.0	Vdc Vdc Vdc mA mV mV mV mV
	Output Sink Current	I_s	2.0	2.5	-	mA
	Input Common Mode Range	CMV_{in}	± 5.0	-	-	Volts
	Common Mode Rejection Ratio $V^- = -7.0$ Vdc, $R_S \leq 200\Omega$	CM_{rej}	80	100	-	dB
	Propagation Delay Time For Positive and Negative Going Input Pulse	t_{pd}	-	40	-	ns
	Power Supply Current $V_{out} \leq 0$ Vdc	I_{D^+} I_{D^-}	-	6.4	9.0	mA
	Power Consumption TO-99 Metal Can TO-91 Flat Package		-	115	150 150	mW

TYPICAL CHARACTERISTICS

FIGURE 1 – VOLTAGE TRANSFER CHARACTERISTICS

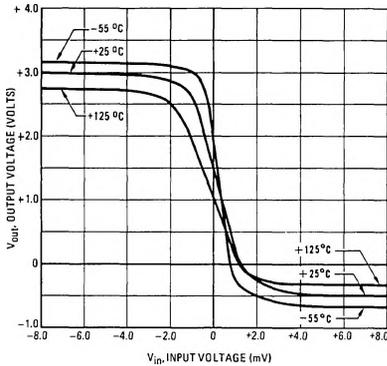


FIGURE 2 – INPUT OFFSET VOLTAGE versus TEMPERATURE

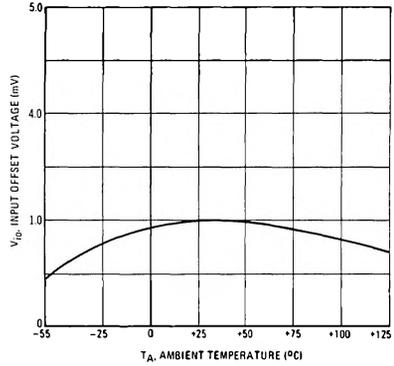


FIGURE 3 – INPUT OFFSET CURRENT versus TEMPERATURE

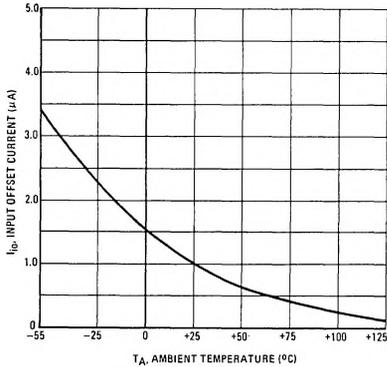


FIGURE 4 – INPUT BIAS CURRENT versus TEMPERATURE

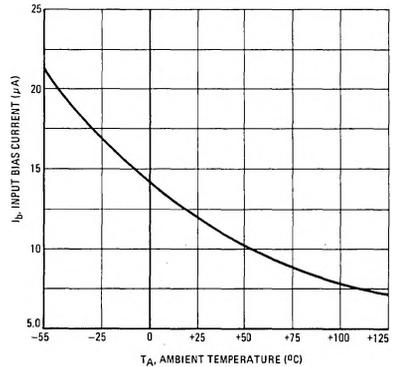


FIGURE 5 – GAIN VARIATION WITH POWER SUPPLY VOLTAGE

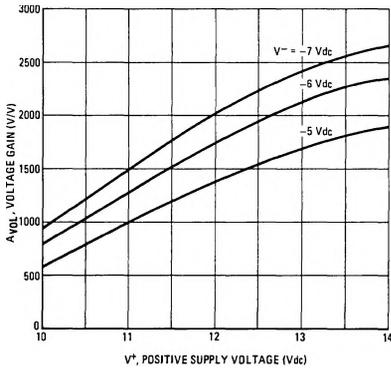
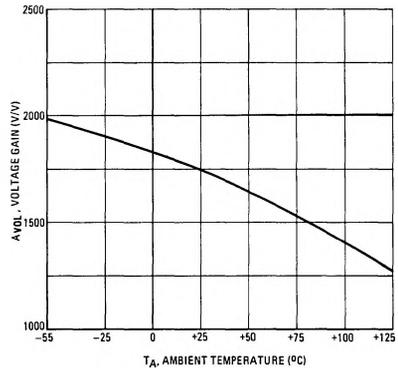


FIGURE 6 – VOLTAGE GAIN versus TEMPERATURE



MC1710 (continued)

FIGURE 7 - RESPONSE TIME

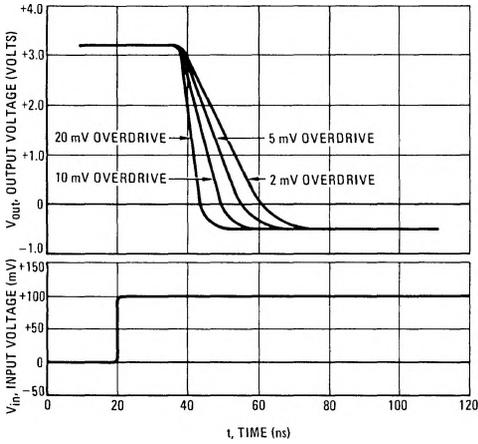


FIGURE 8 - POWER DISSIPATION versus TEMPERATURE

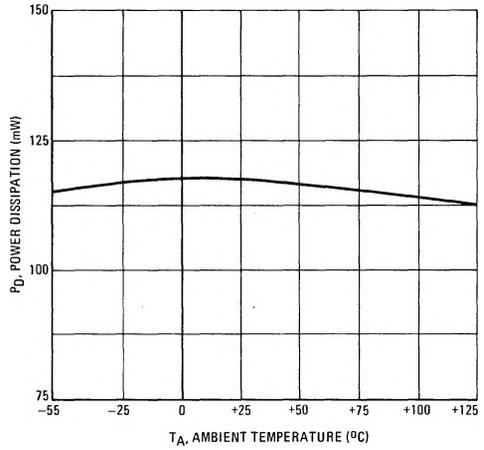


FIGURE 9 - RECOMMENDED SERIES RESISTANCE versus MRTL LOADS

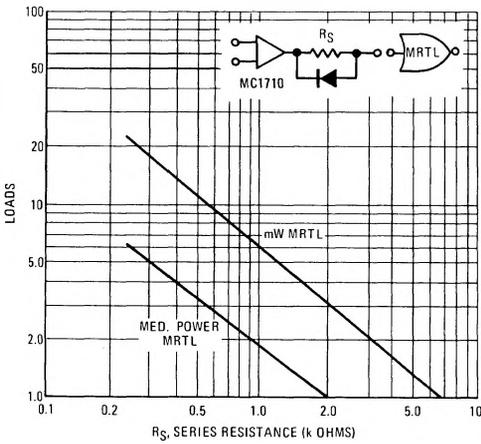


FIGURE 10 - FAN-OUT CAPABILITY WITH MDTL OR MTTL OUTPUT SWING

