LM2900, LM3900 For Specifications, See MC3301 Data.
LM2901 For Specifications, See LM139 Data.
LM2902 For Specifications, See LM124 Data.
LM2903 For Specifications, See LM193
LM2904 For Specifications, See LM158

MC1414
MC1514

2

DUAL DIFFERENTIAL VOLTAGE COMPARATOR

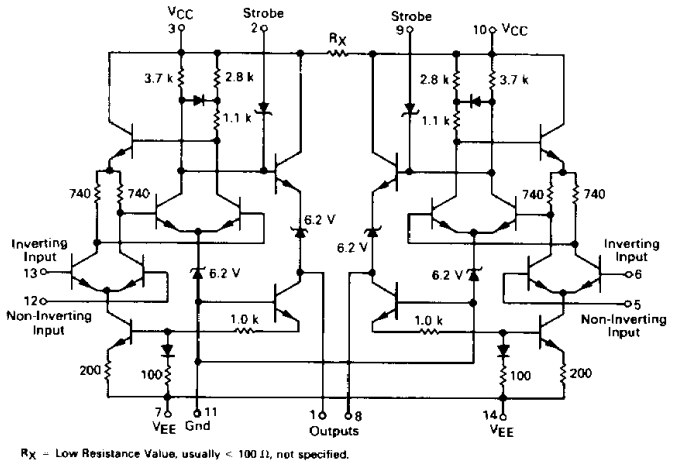
. . . designed for use in level detection, low-level sensing, and memory applications.

- Two Separate Outputs
- Strobe Capability
- High Output Sink Current
  2.8 mA Minimum (Each Comparator) for MC1514
  1.6 mA Minimum (Each Comparator) for MC1414
- Differential Input Characteristics
  Input Offset Voltage = 1.0 mV for MC1514
  = 1.5 mV for MC1414
  Offset Voltage Drift = 3.0 μV/°C for MC1514
  = 5.0 μV/°C for MC1414
- Short Propagation Delay Time — 40 ns Typical
- Output Compatible with All Saturating Logic Forms
  V_O = +3.2 V to −0.5 V Typical

MAXIMUM RATINGS (T_A = 25°C unless otherwise noted.)

Rating	Symbol	Value	Unit
Power Supply Voltages	V_{CC} V_{EE}	+14 −7.0	Vdc
Differential Mode Input Voltage Range	V_{IDR}	±5.0	Vdc
Common Mode Input Voltage Range	V_{ICR}	±7.0	Vdc
Peak Load Current	I_L	10	mA
Power Dissipation (Package Limitation) Ceramic Dual In-Line Package Derate above T_A = 25°C Plastic Dual In-Line Package Derate above T_A = 25°C	P_D	 1000 6.0 625 5.0	 mW mW/°C mW mW/°C
Operating Temperature MC1514 MC1414	T_A	−55 to +125 0 to +75	°C
Storage Temperature Range	T_{stg}	−65 to +150	°C

CIRCUIT SCHEMATIC

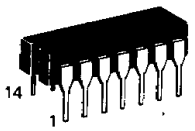


Rx = Low Resistance Value, usually < 100 Ω, not specified.

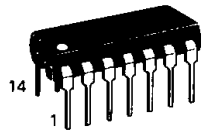
DUAL DIFFERENTIAL COMPARATOR

(DUAL MC1710)

SILICON MONOLITHIC INTEGRATED CIRCUIT

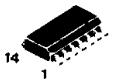


L SUFFIX
CERAMIC PACKAGE
CASE 632

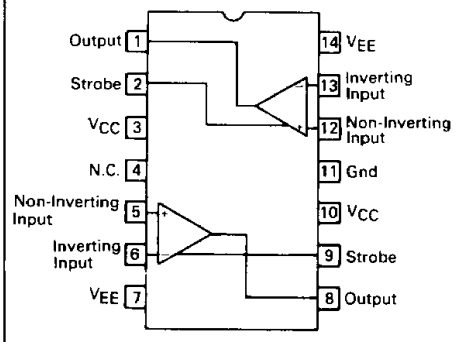


P SUFFIX
PLASTIC PACKAGE
CASE 646
(MC1414 Only)

D SUFFIX
PLASTIC PACKAGE
CASE 751A
(SO-14)
(MC1414 Only)



PIN CONNECTIONS



2

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

Characteristic	Symbol	MC1514 Min	MC1514 Typ	MC1514 Max	MC1414 Min	MC1414 Typ	MC1414 Max	Unit
Input Offset Voltage	V_{IO}							mVdc
(V_O = 1.4 Vdc, T_A = 25°C)		—	1.0	2.0	—	1.5	5.0	
(V_O = 1.8 Vdc, T_A = T_{low}*)		—	—	3.0	—	—	6.5	
(V_O = 1.0 Vdc, T_A = T_{high}*)		—	—	3.0	—	—	6.5	
Temperature Coefficient of Input Offset Voltage	$\Delta V_{IO}/\Delta T$	—	3.0	—	—	5.0	—	μV/°C
Input Offset Current	I_{IO}							μAdc
(V_O = 1.4 Vdc, T_A = 25°C)		—	1.0	3.0	—	1.0	5.0	
(V_O = 1.8 Vdc, T_A = T_{low})		—	—	7.0	—	—	7.5	
(V_O = 1.0 Vdc, T_A = T_{high})		—	—	3.0	—	—	7.5	
Input Bias Current	I_{IB}							μAdc
(V_O = 1.4 Vdc, T_A = 25°C)		—	12	20	—	15	25	
(V_O = 1.8 Vdc, T_A = T_{low})		—	—	45	—	18	40	
(V_O = 1.0 Vdc, T_A = T_{high})		—	—	20	—	—	40	
Open Loop Voltage Gain	A_{vol}							V/V
(T_A = 25°C)		1250	1700	—	1000	1500	—	
(T_A = T_{low} to T_{high})		1000	—	—	800	—	—	
Output Resistance	R_O	—	200	—	—	200	—	Ohms
Differential Voltage Range	V_{IDR}	±5.0	—	—	±5.0	—	—	Vdc
High Level Output Voltage (V_{ID} ≥ 5.0 mV, 0 ≤ I_O ≤ 5.0 mA)	V_{OH}	2.5	3.2	4.0	2.5	3.2	4.0	Vdc
Low Level Output Voltage	V_{OL}							Vdc
(V_{ID} ≥ −5.0 mV, I_{OS} = 2.8 mA)		−1.0	−0.5	0	—	—	—	
(V_{ID} ≥ −5.0 mV, I_{OS} = 1.6 mA)		—	—	—	−1.0	−0.5	0	
Output Sink Current (V_{ID} ≥ −5.0 mV, V_{OL} ≤ 0.4 V, T_A = T_{low} to T_{high})	I_{OS}	2.8	3.4	—	1.6	2.5	—	mAdc
Input Common Mode Voltage Range (V_{EE} = −7.0 Vdc)	V_{ICR}	±5.0	—	—	±5.0	—	—	Vdc
Common-Mode Rejection Ratio (V_{EE} = −7.0 Vdc, R_S ≤ 200 Ω)	CMRR	80	100	—	70	100	—	dB
Strobe Low Level Current (V_{IL} = 0)	I_{IL}	—	—	2.5	—	—	2.5	mA
Strobe High Level Current (V_{IH} = 5.0 Vdc)	I_{IH}	—	—	1.0	—	—	1.0	μA
Strobe Disable Voltage (V_{OL} ≤ 0.4 Vdc)	V_{IL}	—	—	0.4	—	—	0.4	Vdc
Strobe Enable Voltage (V_{OH} ≥ 2.4 Vdc)	V_{IH}	3.5	—	6.0	3.5	—	6.0	Vdc
Propagation Delay Time (Figure 1)	t_{PLH}	—	20	—	—	20	—	ns
	t_{PHL}	—	40	—	—	40	—	
Strobe Response Time (Figure 2)	t_{so}	—	15	—	—	15	—	ns
	t_{sr}	—	6.0	—	—	6.0	—	
Total Power Supply Current, Both Comparators (V_O ≤ 0)	I_{CC}	—	12.8	18	—	12.8	18	mAdc
	I_{EE}	—	11	14	—	11	14	
Total Power Consumption, Both Comparators	P_D	—	230	300	—	230	300	mW

*T_{low} = −55°C for MC1514, 0°C for MC1414
T_{high} = +125°C for MC1514, +75°C for MC1414

FIGURE 1 — PROPAGATION DELAY TIME

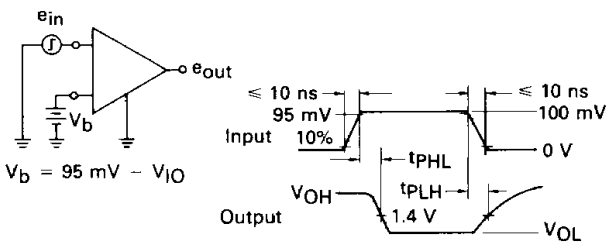
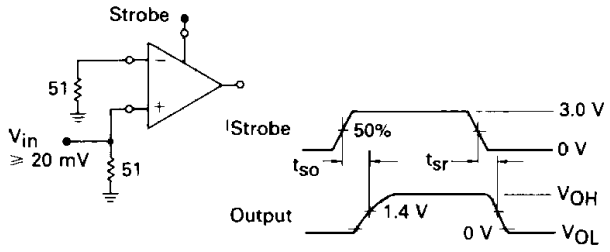


FIGURE 2 — STROBE RESPONSE TIME



TYPICAL CHARACTERISTICS
(Each Comparator)

FIGURE 3 — VOLTAGE TRANSFER CHARACTERISTICS

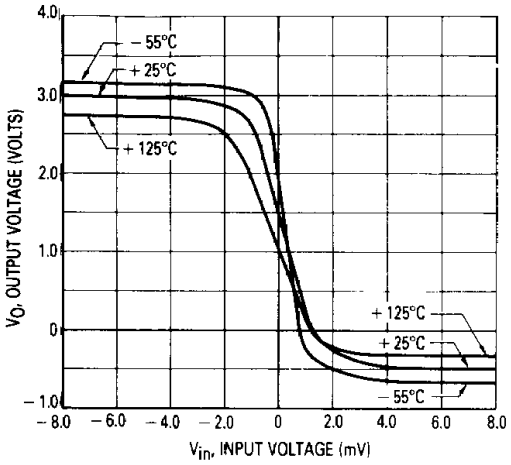


FIGURE 4 — INPUT OFFSET VOLTAGE versus TEMPERATURE

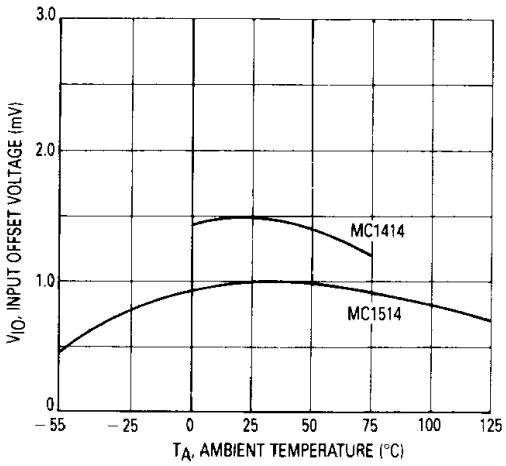


FIGURE 5 — INPUT OFFSET CURRENT versus TEMPERATURE

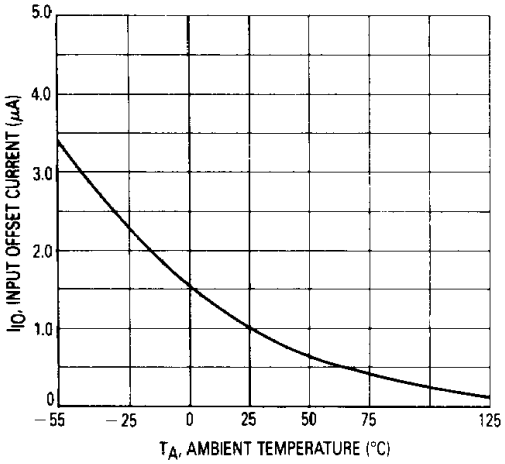


FIGURE 6 — INPUT BIAS CURRENT versus TEMPERATURE

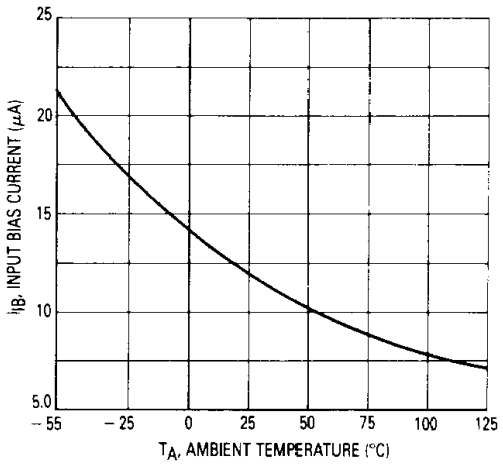


FIGURE 7 — GAIN VARIATION WITH POWER SUPPLY VOLTAGE

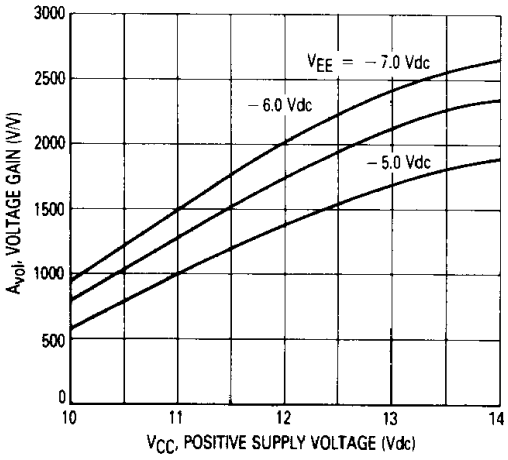


FIGURE 8 — VOLTAGE GAIN versus TEMPERATURE

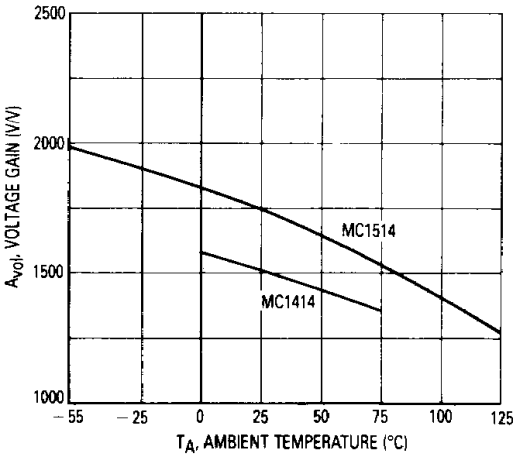


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FIGURE 9 — RESPONSE TIME

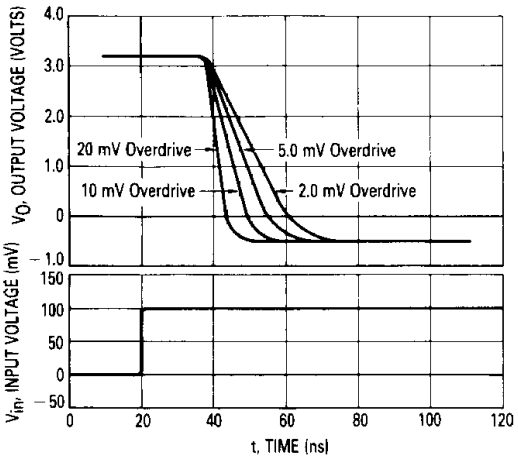


FIGURE 10 — POWER DISSIPATION versus TEMPERATURE

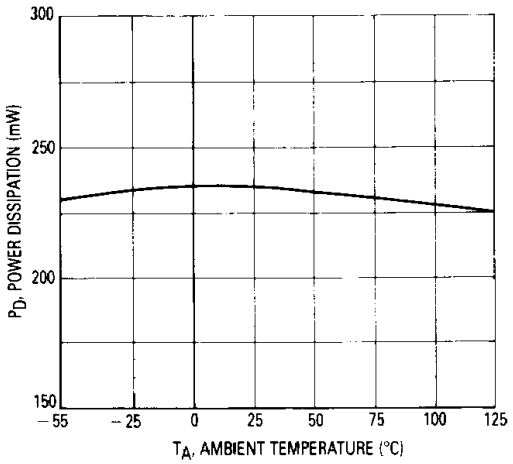


FIGURE 11 — RECOMMENDED SERIES RESISTANCE versus MRTL LOADS

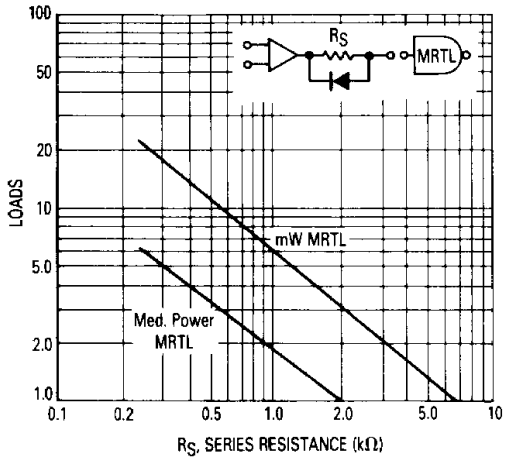


FIGURE 12 — SINK CURRENT versus TEMPERATURE

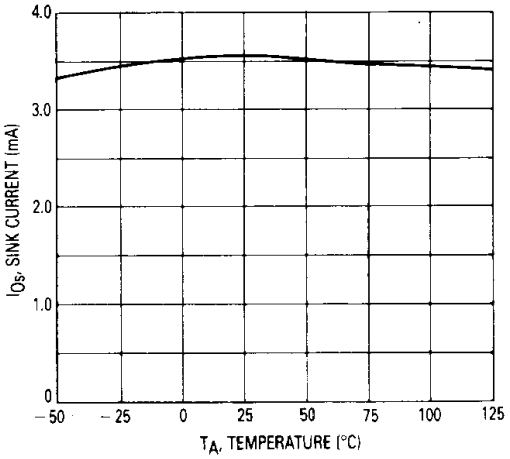
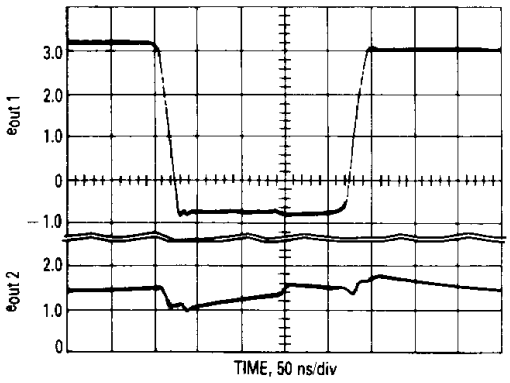


FIGURE 13 — CROSSTALK†



†Worst case condition shown — no load.