



MOTOROLA
Semiconductors

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Advance Information

128 X 8-BIT STATIC RANDOM ACCESS MEMORY

The MCM6810 is a byte-organized memory designed for use in bus-organized systems. It is fabricated with N-channel silicon-gate technology. For ease of use, the device operates from a single power supply, has compatibility with TTL and DTL, and needs no clocks or refreshing because of static operation.

The memory is compatible with the M6800 Microcomputer Family, providing random storage in byte increments. Memory expansion is provided through multiple Chip Select inputs.

- Organized as 128 Bytes of 8 Bits
- Static Operation
- Bi-Directional Three-State Data Input/Output
- Six Chip Select Inputs (Four Active Low, Two Active High)
- Single 5-Volt Power Supply
- TTL Compatible
- Maximum Access Time = 1.0 μ s for MCM6810L
575 ns for MCM6810L-1

ABSOLUTE MAXIMUM RATINGS (See Note 1)

Rating	Symbol	Value	Unit
Supply Voltage	V _{CC}	-0.3 to +7.0	Vdc
Input Voltage	V _{in}	-0.3 to +7.0	Vdc
Operating Temperature Range	T _A	0 to +70	°C
Storage Temperature Range	T _{stg}	-55 to +150	°C

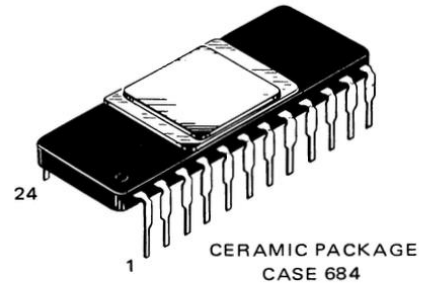
NOTE 1: Permanent device damage may occur if ABSOLUTE MAXIMUM RATINGS are exceeded. Functional operation should be restricted to RECOMMENDED OPERATING CONDITIONS. Exposure to higher than recommended voltages for extended periods of time could affect device reliability.

MCM6810L
MCM6810L-1

MOS

(N-CHANNEL, SILICON-GATE)

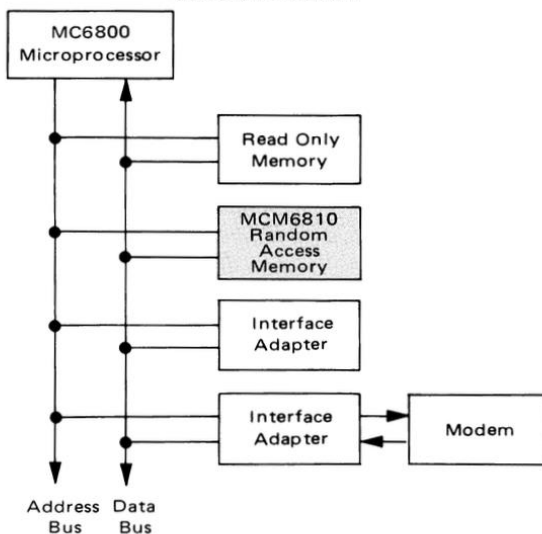
**128 X 8-BIT STATIC
RANDOM ACCESS
MEMORY**



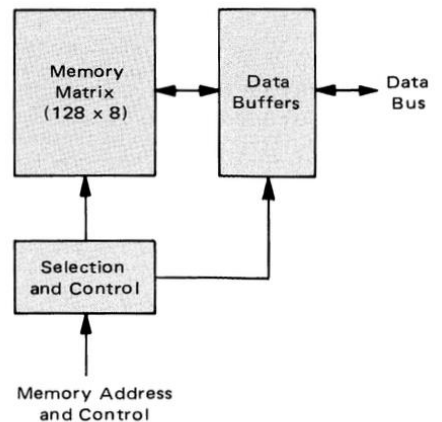
PIN ASSIGNMENT

1	Gnd	V _{CC}	24
2	D0	A0	23
3	D1	A1	22
4	D2	A2	21
5	D3	A3	20
6	D4	A4	19
7	D5	A5	18
8	D6	A6	17
9	D7	R/W	16
10	CS0	CS5	15
11	CS1	CS4	14
12	CS2	CS3	13

M6800 MICROCOMPUTER FAMILY BLOCK DIAGRAM



MCM6810 RANDOM ACCESS MEMORY BLOCK DIAGRAM



DC OPERATING CONDITIONS AND CHARACTERISTICS

(Full operating voltage and temperature range unless otherwise noted.)

RECOMMENDED DC OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	V_{CC}	4.75	5.0	5.25	Vdc
Input High Voltage	V_{IH}	2.4	—	5.25	Vdc
Input Low Voltage	V_{IL}	-0.3	—	0.4	Vdc

DC CHARACTERISTICS

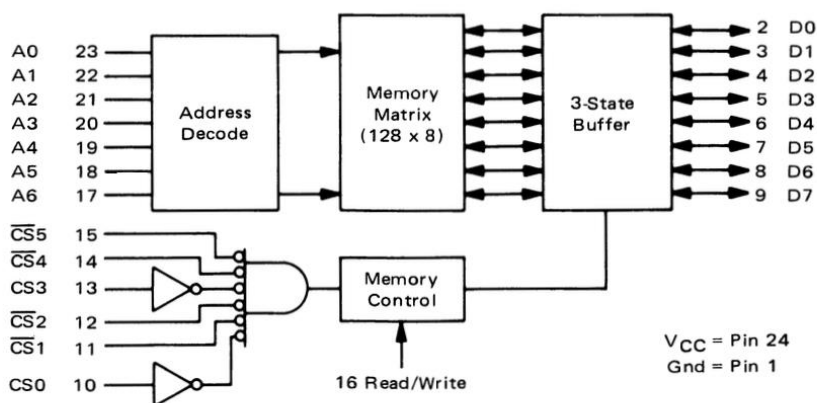
Characteristic	Symbol	Min	Typ	Max	Unit
Input Current ($A_n, R/W, CS_n, \overline{CS}_n$) ($V_{in} = 0$ to 5.25 V)	I_{in}	—	—	2.5	μ A _{dc}
Input High Threshold Voltage	V_{IHt}	2.0	—	—	Vdc
Input Low Threshold Voltage	V_{ILt}	—	—	0.8	Vdc
Output High Voltage ($I_{OH} = -100 \mu$ A)	V_{OH}	2.4	—	—	Vdc
Output Low Voltage ($I_{OL} = 1.6$ mA)	V_{OL}	—	—	0.4	Vdc
Output Leakage Current (D0 – D7) ($V_O = 2.4$ V, $CS = 0.4$ V, $\overline{CS} = 2.4$ V)	I_{LOH}	—	—	10	μ A _{dc}
Output Leakage Current (D0 – D7) ($V_O = 0.4$ V, $CS = 0.4$ V, $\overline{CS} = 2.4$ V)	I_{LOL}	—	—	10	μ A _{dc}
Supply Current ($V_{CC} = 5.25$ V, $T_A = 0^\circ$ C)	I_{CC}	—	—	130	mA _{dc}

CAPACITANCE ($f = 1.0$ MHz, $T_A = 25^\circ$ C, periodically sampled rather than 100% tested.)

Characteristic	Symbol	Max	Unit
Input Capacitance	C_{in}	7.5	pF
Output Capacitance	C_{out}	15	pF

This device contains circuitry to protect the inputs against damage due to high static voltages or electric fields; however, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this high-impedance circuit.

BLOCK DIAGRAM



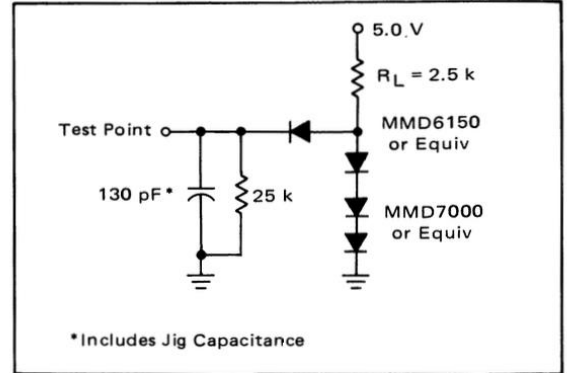
AC OPERATING CONDITIONS AND CHARACTERISTICS

(Full operating voltage and temperature unless otherwise noted.)

RECOMMENDED AC OPERATING CONDITIONS

Parameter	Symbol	Min	Unit
Address Setup Time	t_{AS}	30	ns
Address Hold Time	t_{AH}	0	ns
Chip Select Pulse Width	t_{CS}	800	ns
MCM6810L		400	
MCM6810L-1			

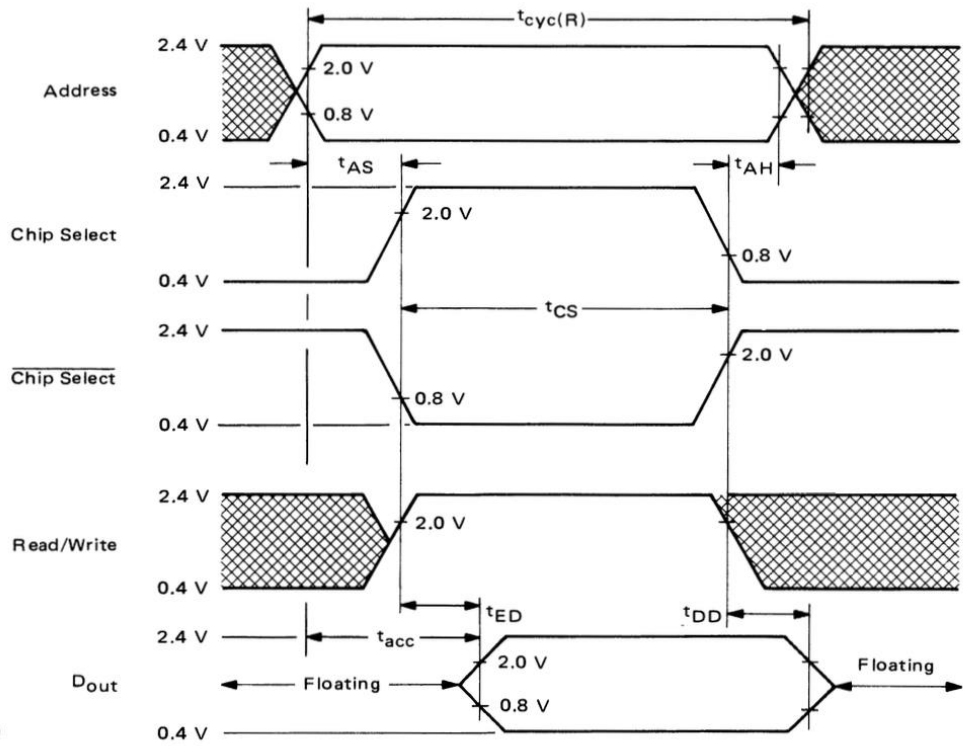
FIGURE 1 – AC TEST LOAD



READ CYCLE (All timing with $t_r = t_f = 20$ ns, Load of Figure 1)

Characteristic	Symbol	Min	Max	Unit
Read Cycle Time	$t_{cyc}(R)$	1000	—	ns
MCM6810L-1		575	—	ns
Output Enable Delay Time	t_{ED}	—	400	ns
MCM6810L-1		—	300	ns
Output Disable Delay Time	t_{DD}	10	200	ns
MCM6810L-1		10	150	ns
Read Access Time	t_{acc}	—	1000	ns
MCM6810L-1		—	575	ns

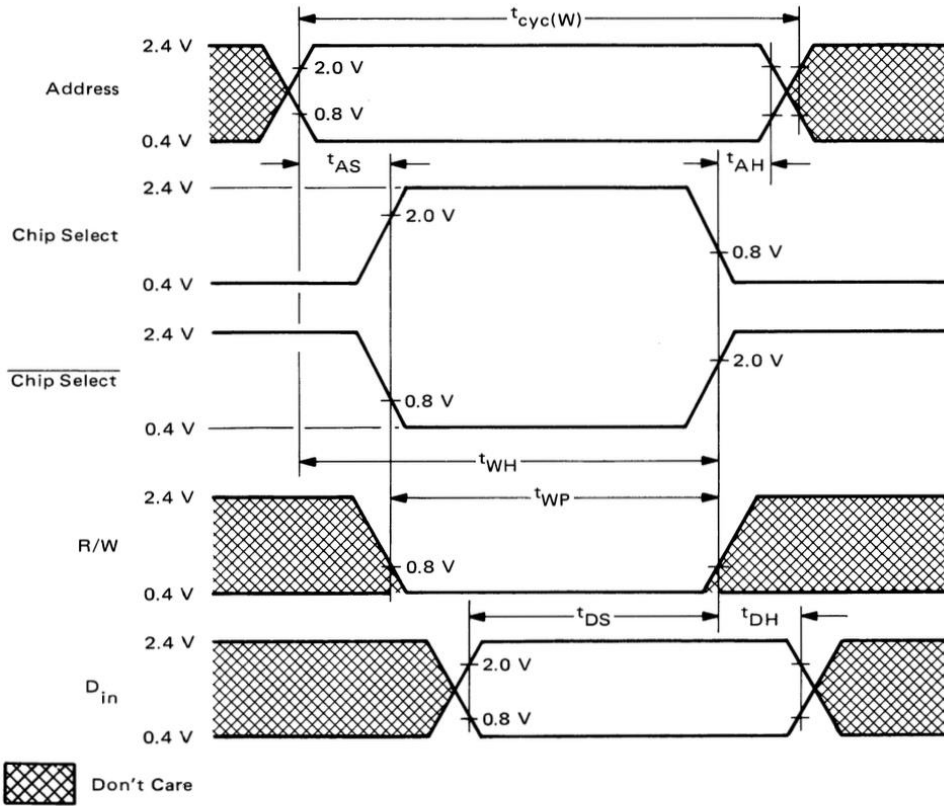
READ CYCLE TIMING



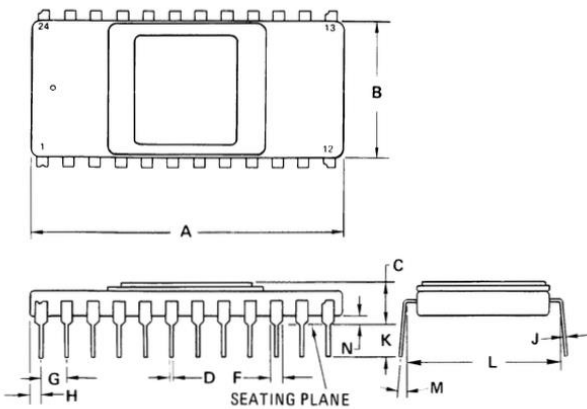
WRITE CYCLE (All timing with $t_r = t_f = 20$ ns, Load of Figure 1)

Characteristic		Symbol	Min	Max	Unit
Write Cycle Time	MCM6810L	$t_{cyc}(W)$	1000	—	ns
	MCM6810L-1		500	—	
Write Pulse Width	MCM6810L	t_{WP}	800	—	ns
	MCM6810L-1		400	—	
Write Pulse Hold Time	MCM6810L	t_{WH}	1000	—	ns
	MCM6810L-1		500	—	
Data Setup Time	MCM6810L	t_{DS}	500	—	ns
	MCM6810L-1		300	—	
Data Hold Time		t_{DH}	0	—	ns

WRITE CYCLE TIMING



PACKAGE DIMENSIONS



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	29.34	30.86	1.155	1.215
B	12.70	14.22	0.500	0.560
C	3.05	3.94	0.120	0.155
D	0.38	0.51	0.015	0.020
F	0.89	1.40	0.035	0.055
G	2.54 BSC		0.100 BSC	
H	0.89	1.40	0.035	0.055
J	0.20	0.30	0.008	0.012
K	2.92	3.68	0.115	0.145
L	14.86	15.87	0.585	0.625
M	—	15 ⁰	—	15 ⁰
N	0.51	1.14	0.020	0.045

- NOTES:
- LEADS WITHIN 0.13 mm (0.005) RADIUS OF TRUE POSITION AT SEATING PLANE WITH MAXIMUM MATERIAL CONDITION.
 - LEAD NO. 1 CUT FOR IDENTIFICATION, OR BUMP ON TOP.
 - DIM "L" TO INSIDE OF LEADS. (MEASURED 0.51 mm (0.020) BELOW PKG BASE)

CASE 684-04

